United States Air Force
611th Air Support Group/
Civil Engineering Squadron

Elmendorf AFB, Alaska

Final
Remedial Investigation and Feasiblity Study

Wainwright Radar Installation,
Alaska

Prepared by:

ICF Technology Incorporated

17 JANUARY 1996

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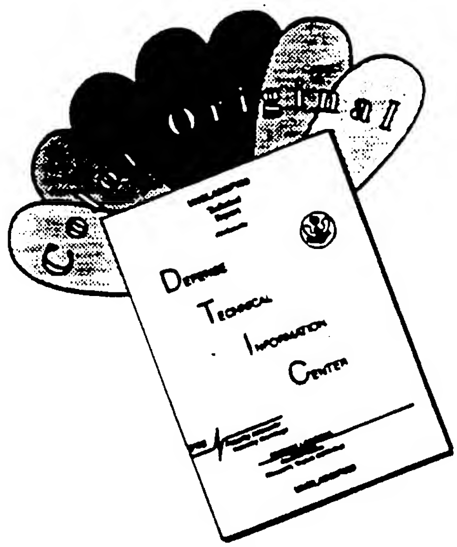

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PREFACE

This report presents the findings of Remedial Investigations and Feasiblity Studies at sites located at the Wainwright radar installation in northern Alaska. The sites were characterized based on sampling and analyses conducted during Remedial Investigation activities performed during August and September 1993. This report was prepared by ICF Technology Incorporated.

This report was prepared between January 1995 and January 1996. Mr. Samer Karmi of the Air Force Center for Environmental Excellence was the Alaska Restoration Team Chief for this task. Dr. Jerome Madden and Mr. Richard Borsetti of the 611 CES/CEVR were the Remedial Project Managers for the project.

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NOTICE

This report has been prepared for the United States Air Force (Air Force) by ICF Technology Incorporated for the purpose of aiding in the implementation of final remedial actions under the Air Force Installation Restoration Program (IRP). As the report relates to actual or possible releases of potentially hazardous substances, its release prior to an Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the IRP, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report, since subsequent facts may become known which may make this report premature or inaccurate. Acceptance does not mean that the United States Air Force adopts the conclusions, recommendations or other views expressed herein, which are those of the contractor only and do not necessarily reflect the official position of the United States Air Force.

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TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

APPENDICES

LIST OF TABLES

LIST OF FIGURES

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EXECUTIVE SUMMARY

BACKGROUND

The United States Air Force (Air Force) has prepared this Remedial Investigation/Feasibility Study (RI/FS) report as part of the Installation Restoration Program (IRP) to present results of RI/FS activities at six sites at the Wainwright radar installation. The IRP provides for investigating, quantifying, and remediating environmental contamination from past waste management activities at Air Force installations throughout the United States. The IRP is a four-phase program that approximates the remedial investigation (RI) and corrective action program used by the U.S. Environmental Protection Agency (EPA) for addressing contaminated sites that may pose a risk to human health or the environment.

The Air Force initiated IRP activities at the Wainwright radar installation in 1980 in response to the Department of Defense's (DOD's) commitment to identify past waste disposal sites and eliminate hazards to public health. The initial Phase I assessment in 1980 conducted by the Air Force concluded that past waste management activities at the installation may have resulted in adverse environmental impacts at several sites (CH2M Hill 1981). Phase 1 activities included a detailed review of pertinent installation records from both government and civilian contractors, contracts with various government and private agencies for documents relevant to the program, and onsite visits during July and August 1981. The onsite visits included interviews with key station employees, ground tours of station facilities, and plane overflights.

In January 1987, an Air Force contractor released the Environmental Assessment for North Warning System (Alaska) (Hart Crowser 1987). The assessment, although not an IRP activity, discussed the impacts of the construction of a short range radar (SRR) station at the Wainwright Distant Early Warning (DEW) Line installation, also referred to as LIZ-3.

An Air Force contractor released the Final Technical Support Document for the Record of Decision, LIZ-3 DEW Line site in 1987 (Woodward-Clyde 1987). The Record of Decision, applicable to five potential hazardous waste sites identified at the Wainwright installation, called for no further action with regard to investigation or cleanup, based on the assessment that there is no significant impact on human health or the environment from suspected or confirmed past contamination at the installation.

In 1989, implementation of plans for the scheduled closure of the Wainwright installation were initiated. In conjunction with the proposed station closure, an Air Force contractor released an Environmental Impact Assessment for the Wainwright installation (Radian 1989). The Environmental Impact Assessment involved a records search, interviews with installation personnel, photos, an installation survey, an electromagnetic survey to detect buried metal objects, and soil and standing water analysis for heavy metals, hydrocarbons, volatile organic compounds (VOCs), and polychlorinated biphenyl (PCBs). The installation was scheduled for closure in September 1989.

In preparation for construction activities associated with proposed radar stations at Wainwright, an Air Force contractor conducted a hydrocarbon soil sampling program (ENSR 1992). A total

of 441 screening samples and 68 analytical samples were taken at the formerly active Wainwright installation. Petroleum hydrocarbons were detected in some soil samples; complete results are described in the report. Construction of the SSR systems was initiated in 1992 and was scheduled to be operational in 1994.

The Air Force initiated Remedial Investigation/Feasibility Study (RI/FS) activities at the Wainwright radar installation in the summer of 1993. During the initial scoping activities, which included record searches, personnel interviews, and physical inspection of the installation, the Air Force and Alaska Department of Environmental Conservation (ADEC) personnel concluded that six sites warranted investigation under the IRP. This document is a detailed presentation of remedial investigation activities and provides conclusions and recommendations for addressing environmental conditions at the six Wainwright sites. Remedial actions are recommended at two of the sites, and no further action is recommended at the remaining four sites.

INSTALLATION DESCRIPTION

The Wainwright radar installation is located at 70°37'N, 150°50'W at the mouth of the Kuk River, on the Chukchi Sea. The installation was constructed as an auxiliary DEW Line station in 1953 and deactivated in 1989. The station is located about 4.5 miles from Wainwright, Alaska, which is a small Inupiat (Northern Eskimo) village on the coast of the Chukchi Sea. The land is owned by the Air Force, and the station covers approximately 1,191 acres. Construction of a Short Range Radar System at the installation began in 1992. This unmanned radar system was scheduled to be operational in 1994. The general location of the installation is shown in Figure 1-1; an area location map is presented in Figure 1-2.

The inactive Wainwright installation consists of one 25-module train, rotating radar, a warehouse, a garage, and fixed POL tanks. The module train contained the living quarters, radar equipment including a radome, recreational facilities, dining facilities, sanitary wastewater treatment facility, potable water treatment facility, diesel power generators, and an incinerator. Support facilities include a 3,500 foot runway just north of the main complex.

The Short Range Radar System that was under construction during 1993 Remedial Investigation (RI) activities at the installation consists of a radar structure, a support building, and a helicopter landing area.

Average daily temperatures range from 49°F to -26°F annually. Precipitation at Wainwright averages six inches per year. Permafrost at the installation area is up to 1,300 feet thick. Due to the permafrost, polygonal surface patterns are abundant.

The hydrology of the installation is controlled by the relatively low topography and permafrost. Even with the low precipitation rates, the tundra is predominantly swampy. Small streams drain the several large and small lakes and swampy land occurring around the installation.

The geology of the Wainwright area is similar to the regional geology. The upper 12 to 18 inches of material in the vicinity of the station consist of Holocene-age silty loan and an organic layer, called a tundra mat, which provides an insulating barrier between the air and the underlying

perennially frozen ground. As shown by the presence of numerous small lakes, ponds, and areas of standing water, the silty loam is generally poorly drained. Undifferentiated bedrock and coal-bearing rocks are exposed in the Kuk River and along the sea cliffs northeast of Wainwright. Thick coal deposits are present under the installation.

Wet sedge meadows set in thermokarst topography, typical of the Arctic plain, dominate the area. The area supports a variety of wildlife typical of the coastal North Slope environments.

PROJECT ACTIVITIES

The Air Force conducted RI/FS field activities at six sites at the Wainwright radar installation during 1993. The objectives of the Wainwright RI/FS are to confirm the presence or absence of chemical contamination of the environment at the installation; define the extent and magnitude of confirmed chemical releases; gather adequate data to determine the magnitude of potential risks to human health and the environment; and gather adequate data to identify and select the appropriate remedial actions for sites where apparent risks exceed acceptable limits.

A three-phased approach was taken for the RI field activities. The three phases, installation presurvey, reconnaissance, and RI field activities, allowed contractor personnel to confirm the location of areas of environmental concern and identify sampling locations before conducting RI field activities. The six sites investigated during the RI activities are:

- Drum Storage Area (ST02);
- Diesel Fuel Spills (SS04);
- Landfill (LF05);
- Garage (SS07);
- Airstrip Diesel (SS08); and
- Vehicle Storage Area (SS09).

The site locations are shown on Figure 1-3 (page 1-9).

The RI field activities were conducted from mid-August through early September of 1993. The RI was conducted in conjunction with RIs at seven other radar installations located throughout northern Alaska. Sixteen contractor employees were stationed in Alaska for the duration of the RI field activities. Sampling activities at the Wainwright radar installation included collection of surface and subsurface soil samples with hand tools and collection of surface water, sediment, and seep samples from drainages adjacent to potentially contaminated discharge areas.

A total of 81 samples was collected during the 1993 RI activities at Wainwright. These included soil, sediment, and surface water samples collected from the six sites, QA/QC samples, and samples collected to establish background levels. A summary of the samples collected is presented in Table ES-1.

Analyses of samples collected during RI activities were conducted by a fixed laboratory [Commercial Testing & Engineering Co. (CT&E)] in Anchorage, Alaska, and a temporary laboratory [Friedman & Bruya, Inc. (F&B)] set up at Barrow, Alaska. Laboratory analyses

TABLE ES-1. SUMMARY OF WAINWRIGHT REMEDIAL INVESTIGATION SAMPLING

SITE	MEDIUM	NUMBER OF ENVIRONMENTAL SAMPLES
Drum Storage Area (ST02)	Soil/Sediment	5
Diesel Fuel Spills (SS04)	Soil/Sediment	11
	Surface Water	3
Landfill (LF05)	Soil/Sediment	6
	Surface Water	2
Garage (SS07)	Soil/Sediment	8
	Surface Water	5
Airstrip Diesel (SS08)	Soil/Sediment	4
	Surface Water	3
Vehicle Storage Area (SS09)	Soil/Sediment	11
	Surface Water	2
Total Environmental Analyses	Soil/Sediment	49
	Surface Water	17
QA/QC SAMPLES		
Ambient Condition Blanks	Water	1
Equipment Blanks	Water	3
Trip Blanks	Water	3
Replicates/Duplicates	Soil/Sediment	5
	Surface Water	3
Total Samples	Soil/Sediment	54
	Surface Water	27

conducted by the temporary laboratory were conducted on a quick turnaround basis. Analyses conducted in Anchorage, Alaska, were primarily standard turnaround but also included a few quick turnaround analyses.

The Air Force conducted a risk assessment once the data had been validated and compiled. The purpose of the risk assessment was to evaluate the human and ecological health risks that may be associated with chemicals released to the environment at the six sites investigated during the RI. The risk assessment characterizes the probability that measured concentrations of hazardous chemical substances will cause adverse effects in humans or the environment in the absence of remediation. The risk assessment will be used in conjunction with state and federal

standards and/or guidance to determine if remediation (site cleanup) is necessary. The Wainwright Risk Assessment (U.S. Air Force 1996) was submitted under separate cover.

CHRONOLOGY OF ACTIVITIES

Project scoping documents were submitted between June and August 1993 for review by Air Force Center for Environmental Excellence (AFCEE) and regulatory agencies. These documents include the Work Plan, Sampling and Analysis Plan, Health and Safety Plan, and Community Relations Plan for seven DEW Line installations and Cape Lisburne. The installation Presurvey and the Reconnaissance trips were conducted in order to provide the information necessary to conduct the RI/FS activities. The Presurvey was conducted in May 1993 by a small group of contractor employees accompanied by Air Force representatives.

The Reconnaissance trip was completed in June 1993 by contractor employees, and AFCEE and ADEC representatives. RI field activities were conducted from mid-August through early September 1993. Sampling was conducted from the areas of least contamination to areas of increasing contamination. The sequence of sampling from least to most contaminated was based on previous sampling data and visual observations. Where quick turnaround sample analyses indicated information gaps about the areal extent of contamination, or exposure point concentrations for potentially exposed populations were not defined, a second round of samples was collected and analyzed.

SUMMARY OF REMEDIAL INVESTIGATION/FEASIBILITY STUDY

The following paragraphs describe RI activities conducted at the six sites that are the focus of this report and summarize the findings of the RI. Summaries of human health and ecological risks posed by chemicals detected at each site are included. The remedial alternatives are presented for the sites recommended for cleanup; however, the recommended remedial alternatives presented throughout the report shall be viewed as a general approach rather than a specific action because there are uncertainties regarding the effectiveness of the remedial alternatives in the unusual environment of the North Slope, future land use, and availability and timing of funding to perform remedial actions. As a result, the recommended alternatives identified in this report should not be considered the final word. Instead, they should be considered the best available approach pending treatability testing and remedial design. The actual remedial action implemented may differ from those recommended in this report as more information and technological advances become available. A complete description and evaluation of the remedial alternatives considered for these sites and the rational for the selected alternatives are presented in the Feasibility Study, Section 5.0.

Drum Storage Area (ST02). The Drum Storage Area (ST02) site is a gravel pad located southwest of the main station adjacent to the lagoon. A gravel road runs from the site to the main station. Approximately fifteen 55-gallon drums are present at the site. Most of the drums at the site are empty; others contain rainwater. A platform support structure exists at the south end of the site, and solidified bags of concrete and wood debris remain along the beach and at the north end of the site. The site was used for temporary storage of drummed products.

Campfire ashes located in the middle of the gravel pad indicate the site may have been used by the residents of Wainwright.

Sampling and analyses have determined that the Drum Storage Area (ST02) is not contaminated. No contaminant was detected at a level of concern in site samples. Because no contaminants were detected at the site, there appears to be no potential for contaminant migration or risks posed by the site to human health or ecological receptors.

Based on the RI sampling and analyses, and the risk assessment, the Drum Storage Area (ST02) site is recommended for no further action.

Diesel Fuel Spills (SS04). The Diesel Fuel Spills site consists of soil/sediment and gravel pad located below and adjacent to the west end of the module train. Two 10,000-gallon fuel spills were reported at the powerhouse section of the module train in the 1970s. Approximately 4,000 gallons from the second spill were recovered and reused. The spills have been estimated to extend from the midpoint of the module train to the western edge of the gravel pad. Smaller spills may have resulted from transfers of diesel oil from bulk fuel storage to the module train day tanks.

Sampling and analyses have determined that the Diesel Fuel Spills site is contaminated primarily with petroleum hydrocarbons. The contaminated areas at the site are soil/sediment and surface water beneath the west end of the module train at the site. The likely sources of contamination are spills and/or leaks from the day tanks inside the module train.

Migration of contaminants from the site appears to have occurred to a limited degree through a culvert that leads from below the module train to the tundra area to the north. Very low levels of gasoline range petroleum hydrocarbons (GRPH) were detected in a soil/sediment sample from this tundra area.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Even with the very conservative approach used in the risk assessment, the risk posed by the site is not of a magnitude that normally requires remedial action. Therefore considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel) detected at the site, however, significantly exceed ADEC guidance cleanup levels; therefore, the site is recommended for remedial action. Passive bioremediation is the recommended alternative for remediation of the area below the module train. A complete description and evaluation of the remedial alternatives recommended for this site are presented in the Feasibility Study, Section 5.0.

Landfill (LF05). The Landfill site is located on the tundra, which gently slopes to the Kuk River, approximately 800 feet southwest of the motor vehicle gasoline (MOGAS) tanks on the south end of the main station area. The inactive Landfill covers approximately half an acre and is covered with gravel to a depth of approximately four feet. The Landfill received all wastes generated at the station between approximately 1974 and 1989.

Sampling and analyses have determined that there is no significant contamination at the Landfill site. Only relatively low levels of contaminants were detected. The source is suspected to be previous waste disposal at the Landfill. The Landfill is no longer active.

Migration of contaminants from the site appears minimal based on the surface water samples collected in drainage pathways leading from the site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Even using the conservative future scenario, the potential human health risks at the site are not of a magnitude that normally requires remedial action. Although the hazard quotients (HQs) for ecological receptors indicate low potential risks, these are based on very conservative estimates that probably overestimate the risks to representative species, and overall risks to ecological receptors at the site are minimal. Based on the RI sampling and analyses, risk assessment, and current or future site uses, remedial actions are not warranted at the site. No significant human health or ecological risk was identified at the site. Therefore, the Landfill site is recommended for no further action.

Garage (SS07). The Garage site is located north of the module train and west of the warehouse and is surrounded by gravel pad. The Garage building is approximately 80 feet by 40 feet and was used for vehicle maintenance and storage. The building is raised approximately four feet above the tundra and is bounded by a four-foot gravel pad on all sides. Floor drains in this building previously discharged directly to the tundra; however, the site has been inactive since 1989. Culverts lead from under the Garage to the tundra to the west and to a large ponded area surrounded by a gravel berm to the east.

Sampling and analyses have determined that the Garage site is contaminated with petroleum hydrocarbons [diesel range petroleum hydrocarbons (DRPH), GRPH, and residual range petroleum hydrocarbon (RRPH)], benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, and other VOCs that are common components of fuel. Some metals (inorganics) detected at the site at slightly elevated levels are also considered to be chemicals of concern (COCs). The contaminated media at the site include soil/sediment and surface water. The soil/sediment areas beneath the site building have the highest concentrations of contaminants. The likely source of contamination is previous discharge of waste materials to floor drains in the building.

Migration of contaminants from the site appears to have occurred via a stream and culverts that lead from beneath the Garage building to tundra areas. Contaminants detected in the sediment sample collected from the mouth of the west culvert leading from the Garage were similar to those detected below the Garage building; however, concentrations were lower. DRPH and RRPH were also detected in a drainage pathway downgradient of the west culvert indicating that contaminant migration has occurred.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Under a future scenario, using the surface water in the drainage pathways from the site as a drinking water supply results in a potential risk to human health. This human health risk, however, is not of a magnitude that

normally requires remedial action. The ecological risk assessment concluded that the overall potential risks presented by site contaminants are low. Therefore, considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel and residual range organics) detected in soil/sediment at the site significantly exceed ADEC guidance cleanup levels. In addition, site contaminants have migrated downgradient of the site and have impacted soil/sediment and surface water. Therefore, the site is being recommended for remedial action. The contaminated areas at the site include the area beneath the building and the tundra area to the west. The remedial action alternative recommended for beneath the building is passive bioremediation. A complete description and evaluation of the remedial alternatives recommended for the site are presented in the Feasibility Study, Section 5.0.

Airstrip Diesel (SS08). The Airstrip Diesel site is located adjacent to the north side of the airstrip at the junction of the road to Freshwater Lake. The area consists of tundra and a gravel pad elevated approximately four feet above the tundra. A helicopter pad was under construction during the 1993 field sampling season at this site.

Sampling and analyses have determined that the Airstrip Diesel site is not contaminated. No contaminant was detected in site samples, so there appears to be no potential for contaminant migration, or risks to human or ecological receptors.

Based on RI sampling and analyses, the Airstrip Diesel site is recommended for no further action.

Vehicle Storage Area (SS09). The Vehicle Storage Area site consists of a gravel pad that was historically used for vehicle storage. The site is located approximately 100 yards southeast of the module train in the vicinity of the new SRR system. New construction on and adjacent to the site includes the SRR tower, a technical services building, and two satellite ground terminals. A gravel pad was added to the original Vehicle Storage Area and adjacent road during construction of the SRR structures. During the current construction activities, soil boring materials that were considered potentially contaminated were stockpiled north of the Vehicle Storage Area site. These stockpiled soils were sampled as part of the RI at the site.

Sampling and analyses have determined that there is no significant contamination at the Vehicle Storage Area. Only very low levels of contaminants were detected. The source, although unknown, is possibly leaks or spills caused by previous vehicle storage activities at the site.

Migration of contaminants from the site appears minimal based on samples collected in drainage pathways leading from the site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Potential hazards and risks were identified in surface water from barium, manganese, vadium, zinc, and 1,2-dichloroethane. The potential human health risks are based on a future scenario in which the site surface water would be used as a sole-source drinking water supply and are probably overestimated by at least an order of magnitude.

Based on the RI sampling and analyses and the risk assessment, remedial actions are not warranted at the site. No significant human health or ecological risks were identified at the site. Therefore, the Vehicle Storage Area site is recommended for no further action.

CONCLUSIONS

To meet the Air Force's commitment to identify, quantify, and remediate waste disposal sites at installations throughout the United States, the prime contractor completed an RI/FS at six sites at the Wainwright radar installation. The investigation was completed in accordance with the guidelines established in the Air Force's IRP. The RI/FS involved field investigations, sampling, and analyses.

Based on the RI sampling, data analyses, and quantitative risk assessment, the Air Force has concluded there is no risk associated with observed conditions and recommends no further remedial action for four of the six sites. These sites, presented in Table ES-2, are the Drum Storage Area (ST02), Landfill (LF05), Airstrip Diesel (SS08), and Vehicle Storage Area (SS09). At the two remaining sites, contaminant levels either may represent a potential risk to receptor populations or exceed ADEC cleanup guidance levels. It is recommended that remedial actions be conducted at these sites. These sites include the Diesel Fuel Spills (SS04) and the Garage (SS07). The remedial action alternatives recommended for these two sites are presented in Table ES-3.

TABLE ES-2. SITES RECOMMENDED FOR NO FURTHER ACTION

SITE NAME	SITE ID NUMBER
Drum Storage Area	ST02
Landfill	LF05
Airstrip Diesel	SS08
Vehicle Storage Area	SS09

TABLE ES-3. SITES RECOMMENDED FOR REMEDIAL ACTION

SITE NAME	SITE ID NUMBER	MEDIUM	RECOMMENDED REMEDIAL ALTERNATIVE
Diesel Fuel Spills	SS04	Soil/Sediment Beneath West End of the Module Train	Passive Bioremediation
Garage	SS07	Soil/Sediment Beneath Garage	Passive Bioremediation

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1.0 INTRODUCTION

The Air Force has prepared this RI/FS report to present the results of RI/FS activities at six sites located at the Wainwright radar installation. The RI field activities were conducted at the Wainwright radar installation during the summer of 1993. The six sites at Wainwright were investigated because they were suspected of being contaminated with hazardous substances. The RI/FS was conducted in accordance with the requirements of the Air Force IRP. RI activities were conducted using methods and procedures specified in the RI/FS Work Plan, Sampling and Analysis Plan (SAP), and Health and Safety Plan (U.S. Air Force 1993a,b,c).

Section 1.0 of this report presents information concerning the objectives and implementation of the IRP, a description of the installation and its environmental setting at Wainwright, and brief background information on the six Wainwright sites. Project activities, including project objectives and scope, summaries of field and laboratory methods, methodologies for data evaluation and risk estimation, and a summary of background sampling, analytical results, and migration pathways are described in Section 2.0. Section 3.0 documents the RI sampling and analysis results on a site-by-site basis for the four sites where no further action is recommended, identifies potential migration pathways and receptors, summarizes the human health and ecological risks, and describes the conclusions and recommendations for each of these sites. Section 4.0 presents the RI sampling and analysis results on a site-by-site basis for the two sites where remedial actions may be warranted. This section also identifies all Applicable or Relevant and Appropriate Requirements (ARARs), potential migration pathways, and receptors; summarizes human health and ecological risks; and describes the conclusions and recommendations, including the recommended remedial alternative, for cleanup at each site. Section 5.0 presents the Feasibility Study (FS) of potential remedial actions for the sites that may require cleanup.

The recommended actions for each of the sites, presented in Sections 3.0 through 5.0, are preliminary. The actions for each site will be determined only after review of this RI/FS document and the Wainwright Risk Assessment (U.S. Air Force 1996) by regulatory agencies and interested parties. When agreement is reached between the Air Force and regulatory agencies as to the appropriate action for each site, a Decision Document will be prepared by the Air Force that presents the rationale for selecting a particular action. The Decision Document will also formally document the selection by ensuring appropriate Air Force and state and federal agency coordination and concurrence.

Appendix A provides references and a list of acronyms used in this document. Appendix B presents photographs of the Wainwright radar installation and sites. Appendix C is the Statement of Work describing the scope of the RI/FS activities at the Wainwright radar installation. Sample collection logs are presented in Appendix D; sample Chain-of-Custody forms are in Appendix E. Cross-reference tables and analytical data are presented in Appendix F, and Data Validation Reports are in Appendix G.

1.1 THE UNITED STATES AIR FORCE INSTALLATION RESTORATION PROGRAM

The Air Force IRP is the basis for assessment and response action on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The Air Force IRP is designed to identify, confirm/quantify, and remedy problems associated with past and present management of hazardous substances and hazardous wastes at Air Force facilities. CERCLA defines a hazardous substance in Section 101; the definition includes, as examples, any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act (FWPCA), any element, compound, mixture, solution, or substance designated pursuant to Section 102 of CERCLA, and hazardous wastes identified pursuant to Section 3001 of the Resource Conservation and Recovery Act (RCRA). A hazardous waste, as defined in RCRA, "may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed" (Section 1004[2][B] of RCRA).

The DOD initiated the IRP in 1976 to identify, investigate, and mitigate environmental hazardous waste contamination that may be present at DOD facilities. In June 1980, DOD issued Defense Environmental Quality Program Policy Memorandum (DEQPPM) 80-6, requiring identification of past hazardous waste disposal sites at DOD agency installations. The Air Force implemented DEQPPM 80-6 in December 1980 and revised it in 1981.

Executive Order 12316 of 14 August 1981 directed the military to design its own program to remedy uncontrolled hazardous waste disposal sites consistent with the National Contingency Plan (NCP) established by CERCLA. In response to the directive, the DOD instructed its branches to identify hazardous waste disposal sites to which they contributed wastes, and to comply with environmental regulations at the installation level when implementing cleanup. DOD subsequently developed the basic IRP after which the Air Force IRP was modeled. DEQPPM 81-5 of 11 December 1981, implemented by Air Force Headquarters in January 1982, sets forth the basic authority and objectives for the Air Force programs.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) augmented the scope and requirements of CERCLA and provided specific directives to federal facilities regarding investigation of waste disposal sites. Under SARA, technologies that provide permanent removal or destruction of hazardous wastes or contaminants are preferable to actions that only contain or isolate the materials. SARA also provides for greater interaction with public and state agencies and expands the role of the EPA in the evaluation of the health risks associated with contamination. SARA requires early determination of ARARs and the consideration of potential remediation alternatives at the initiation of an RI/FS. Remedial actions taken under CERCLA must comply with ARARs, which generally consist of federal, state, and local regulations. Remedial actions at facilities regulated under CERCLA are selected based on the results of an RI/FS. The RI/FS process is described in the NCP. The RI phase includes specific steps for determining the nature and extent of environmental contamination. Subsequently, the FS is implemented to evaluate alternative remedial actions prior to selection of the most appropriate action for a specific facility.

To respond to changes in the NCP brought about by SARA, the Air Force modified its IRP in November 1986 to improve continuity in the site investigation and remedial planning process for Air Force installations. In July 1987 the President signed Executive Order 12580, delegating responsibility to secretaries of various agencies to conduct site investigations and remedial actions at federal facilities. The order defined relationships between various federal and state agencies and assigned EPA the role of facilitator in resolving conflicts.

Prior to 1988 the Air Force IRP was organized into four phases, described below:

- Phase I, Installation Assessment/Records Search, identified past waste disposal sites at Air Force installations that might pose a hazard to public health or the environment. Sites identified during Phase I could be recommended for no further action, confirmation studies (Phase II), or remedial action (Phase IV).

- Phase II, Confirmation/Quantification, was intended to define and quantify contamination present at sites identified during Phase I. Stage 1 of Phase II consisted of an initial assessment, including environmental sampling, to determine whether contamination was present. Depending on the results of Stage 1, subsequent stages of investigation could be recommended to improve the characterization of site contamination.

- Phase III, Technology-Based Development, included development of new technologies for treating contaminants identified at Air Force installations. The results of Phase II investigations were used to determine the need for Phase III activities.

- Phase IV, Remedial Action, involved development and implementation of plans to remedy contamination at sites.

In 1988, the Air Force replaced the phased approach of the IRP with an approach more closely resembling the RI/FS approach used by EPA. Under this approach, Phase II investigations and Phase IV remedial action planning are conducted in a more parallel fashion to expedite implementation of site cleanups.

1.2 INSTALLATION DESCRIPTION AND ENVIRONMENTAL SETTING

The inactive Wainwright installation consists of one 25-module train, rotating radar, a warehouse, a garage, and fixed POL tanks. The module train contains the sanitary wastewater treatment facility, the potable water treatment facility, diesel power generators, radar equipment including a radome, recreational facilities, dining facilities, and an incinerator. Support facilities include a 3,500-foot runway just north of the main complex.

The SRR System that was under construction during the 1993 RI activities at the station consists of a radar structure, a support building, and a helicopter landing area.

A variety of past activities at the station may have resulted in environmental contamination. The Air Force is investigating and remediating actual and potential sources of contamination through activities conducted under the IRP.

1.2.1 Physical Geography

The Wainwright radar installation is located at 70°37'N, 150°50'W at the mouth of the Kuk River, on the Chukchi Sea. The installation was constructed as an auxiliary station in 1953 and deactivated in 1989. The station is located about 4.5 miles from Wainwright, Alaska, which is a small Inupiat (Northern Eskimo) village on the coast of the Chukchi Sea. The land is owned by the Air Force and the station covers approximately 1,191 acres. The general location of the installation is shown on Figure 1-1; an area location map is presented in Figure 1-2. A site plan of the installation is provided as Figure 1-3.

1.2.2 Climate (Meteorological Conditions and Air Quality)

Annual average precipitation at the Wainwright installation is 6 inches per year, which includes 12 inches of snow. Storms are primarily from the west during the summer when a high pressure system centered over the northern Pacific forces storms northward through the Bering Strait, where they turn easterly toward the station.

Summer temperatures average between 30°F and 49°F. The record high temperature of 80°F occurred in July 1955. Winter temperatures average between -26°F and 6°F. The record low of -56°F occurred in February 1964 (Hart Crowser 1987).

Prevailing winds are easterly and average nearly 10 mph. There is little monthly variation; however, November winds are strongest. Maximum steady winds of 35 mph can occur in any month, and occasional strong gusts attain much greater speeds.

Because of very sparse development and the associated lack of major air pollution sources, air quality in the area is good. Air inversions are common, but the persistent light winds along the coastal plain and general lack of source emissions prevent the development of air masses containing pollutants (Radian 1989).

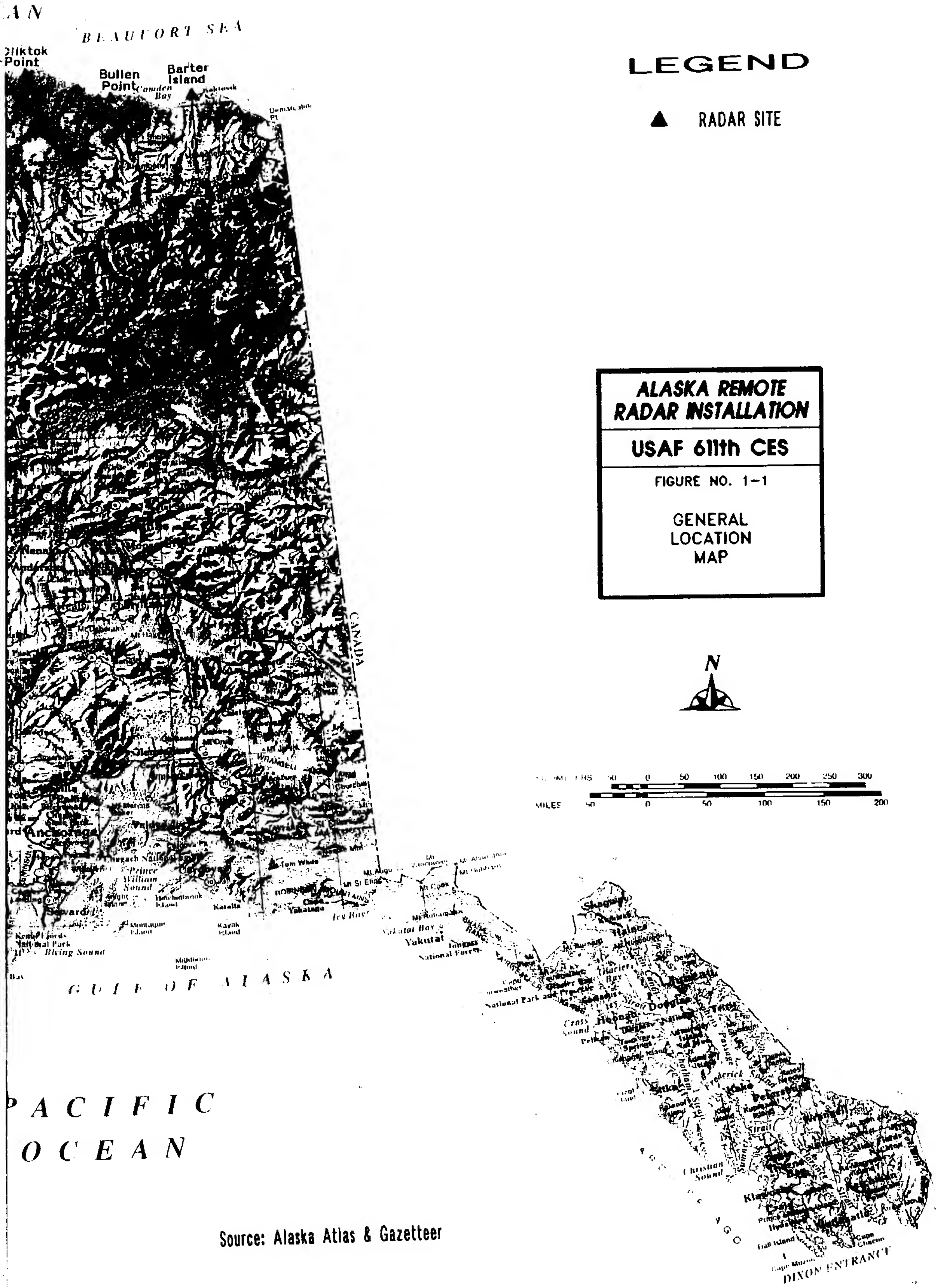
1.2.3 Geology

This section presents information on the regional and local geology of the Wainwright area.

1.2.3.1 Regional Geology. Geologic units of all the principal time-stratigraphic systems from Precambrian to Quaternary are represented in Alaska. For the last two or three million years, frost climates have prevailed in Alaska, and the geomorphic processes have been either periglacial or glacial (Wahrhaftig 1965). Although glacial activity was extensive, it was by no means all-encompassing. Glaciation is evident in many parts of the state including the Pacific Mountain System, Arctic Mountains, Ahklun Mountains, and southern Seaward Peninsula. Some great expanses, however, had no glacial activity. The principal areas not glaciated include the Intermountain Plateaus, Arctic Foothills, the Arctic Coastal Plain. Many periglacial features such


ARCTIC OCEAN
BEAUFORT SEA
Barrow
Point Barrow
Wainwright
Point Lonely
Oliktok Point
Bullen Point
Barter Island
Point Lay
Cape Lisburne
Point Hope
CHUKCHI SEA
RUSSIA
UNITED STATES
Kivalina
Kotzebue
KOTZEBUE SOUND
Shishmaref
BERING STRAIT
Gambell
Savoonga
SAINT LAWRENCE ISLAND
Nome
Norton Bay
NORTON SOUND
Stebbins
Unalakleet
Emmonak
Alakanuk
BERING SEA
Hooper Bay
Nunivak Island
Kipnuk
Quinhagak
KUSKOKWIM BAY
Platinum
Togiak Bay
Saint Paul
Saint George
BRISTOL BAY
Kvichak Bay
Iliamna Lake
Anchorage
Spenard
Kenai
Soldotna
Homer
Seward
COOK INLET
Prince William Sound
Kennedy Entrance
Stevenson Entrance
Kodiak
SHELIKOF STRAIT
PACIFIC OCEAN
Pilot Point
Port Heiden
Chignik Bay
Wide Bay
Stepovak Bay
Sand Point
King Cove
Izembek National Wildlife Refuge
Cold Bay
Unimak Pass

Source:



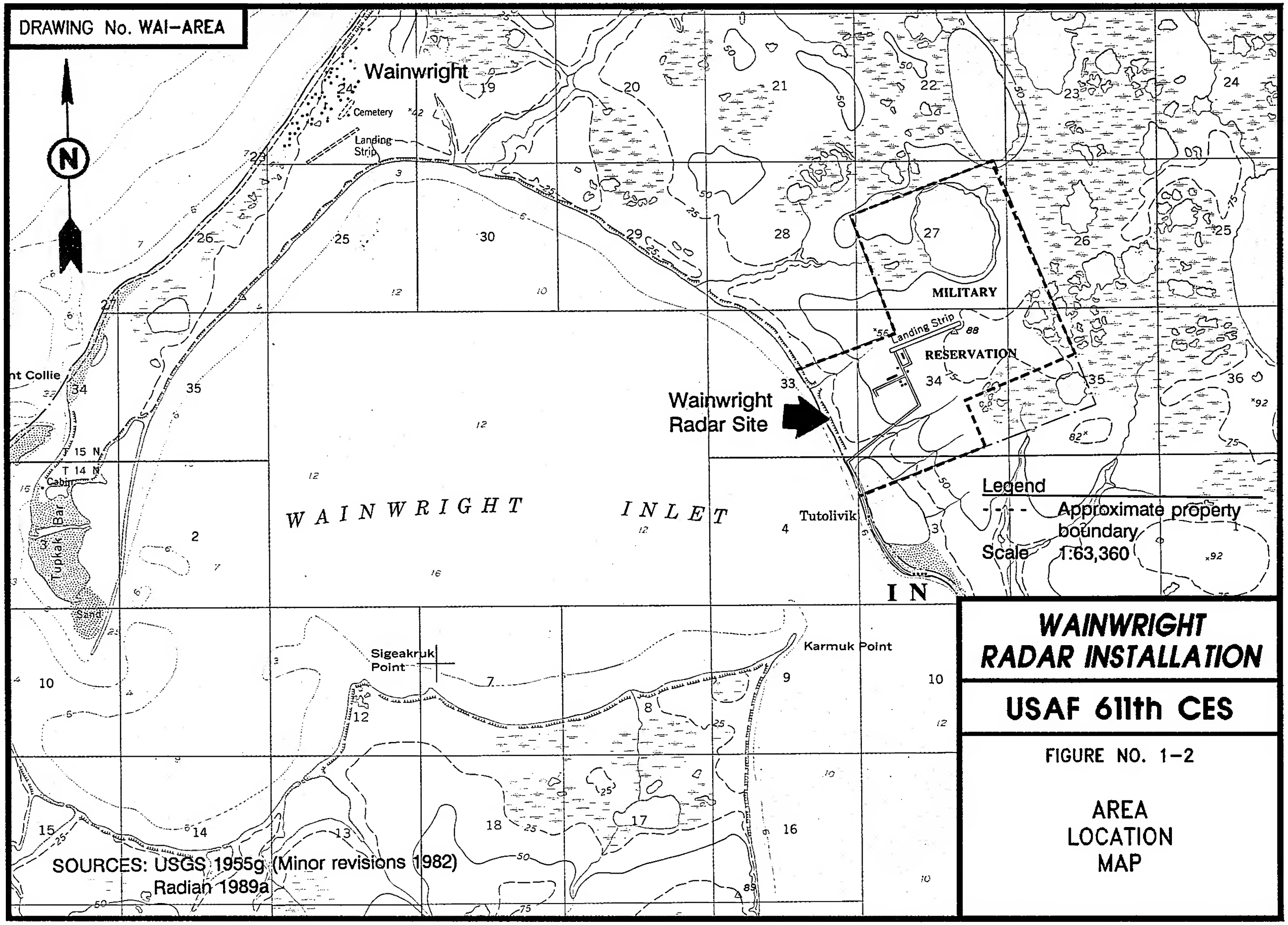
ALASKA REMOTE RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 1–1

GENERAL LOCATION MAP

Source: Alaska Atlas & Gazetteer



WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 1-2

AREA LOCATION MAP

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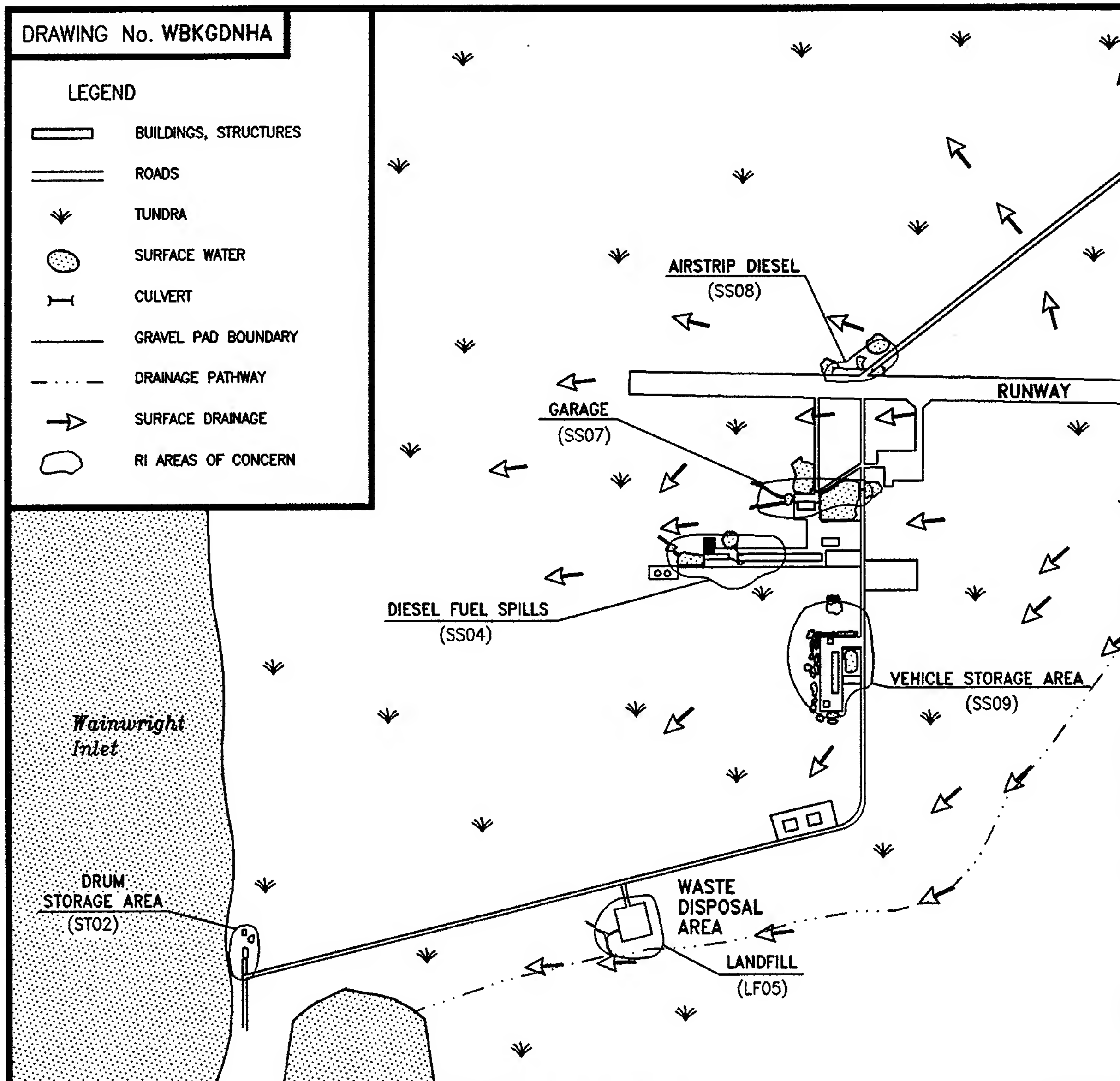

WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 1-3

INSTALLATION SITE PLAN

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as polygonal ground, sorted circles, pingos, and ice wedges can be observed on the Arctic Coastal Plain. Figure 1-4 depicts the extent of Alaska's glacial areas.

Alaska's generally cold climate regime has produced permafrost, a combination of geologic, hydrologic, and meteorologic characteristics that produces permanently frozen ground. Permafrost occurs in both unconsolidated sediments and bedrock; its distribution includes most of the state, with the notable exception of the Pacific Coastal area. Permafrost is continuous on the Arctic Coastal Plain and has a significant impact on the flow of ground and surface water. The distribution of Alaska's permafrost areas is shown on Figure 1-5. Permafrost is discussed in detail in Section 1.2.4.1.

The very strong geologic processes at work in Alaska have produced a unique environmental setting reflected in the general geology of the Arctic Region (Figure 1-6). A popular theory of the formation of the Arctic Region is that it was once an ocean basin adjacent to the Canadian Shield. Rifting of the Canadian Shield occurred during Mesozoic time, and the Arctic Region drifted southwest forming the Colville Basin to the south and the Arctic Ocean to the north. At the same time, the Brooks Range orogeny began creating a source for the newly-created Colville Basin. Continued uplift of the Brooks Range produced a prograding delta that filled in the Colville Basin.

1.2.3.2 Local Geology. The Wainwright radar installation lies at an elevation of approximately 55 feet above mean sea level (MSL) on a bluff east of Wainwright Inlet and the Kuk River. The slope from the station to Wainwright Inlet is approximately one half mile long.

The geology of the Wainwright area is similar to the regional geology. The upper 12 to 18 inches of material in the vicinity of the station consists of Holocene-age silty loam and an organic layer, called a tundra mat, which provides an insulating barrier between the air and the underlying perennially frozen ground. As shown by the presence of numerous small lakes, ponds, and areas of standing water, the silty loam is generally poorly drained. Undifferentiated bedrock and coal-bearing rocks are exposed in the Kuk River and along the sea cliffs northeast of Wainwright. Thick coal deposits are present under the installation.

There are no metallic mineral deposits or active oil and gas fields in the vicinity of the Wainwright installation. Extensive seismic surveys have been conducted to assess the oil and gas potential, but few of the data have been released. The installation is in an area of low seismicity.

1.2.4 Hydrology

Ground water/permafrost and surface water are discussed in the following sections.

1.2.4.1 Ground Water/Permafrost. Permafrost has a profound influence on Alaska's ground water resources. Permafrost is defined by the Glossary of Geology (American Geological Institute 1972) as:

- Any soil, subsoil, or other surficial deposit, or even bedrock, occurring in arctic or subarctic regions at a variable depth beneath

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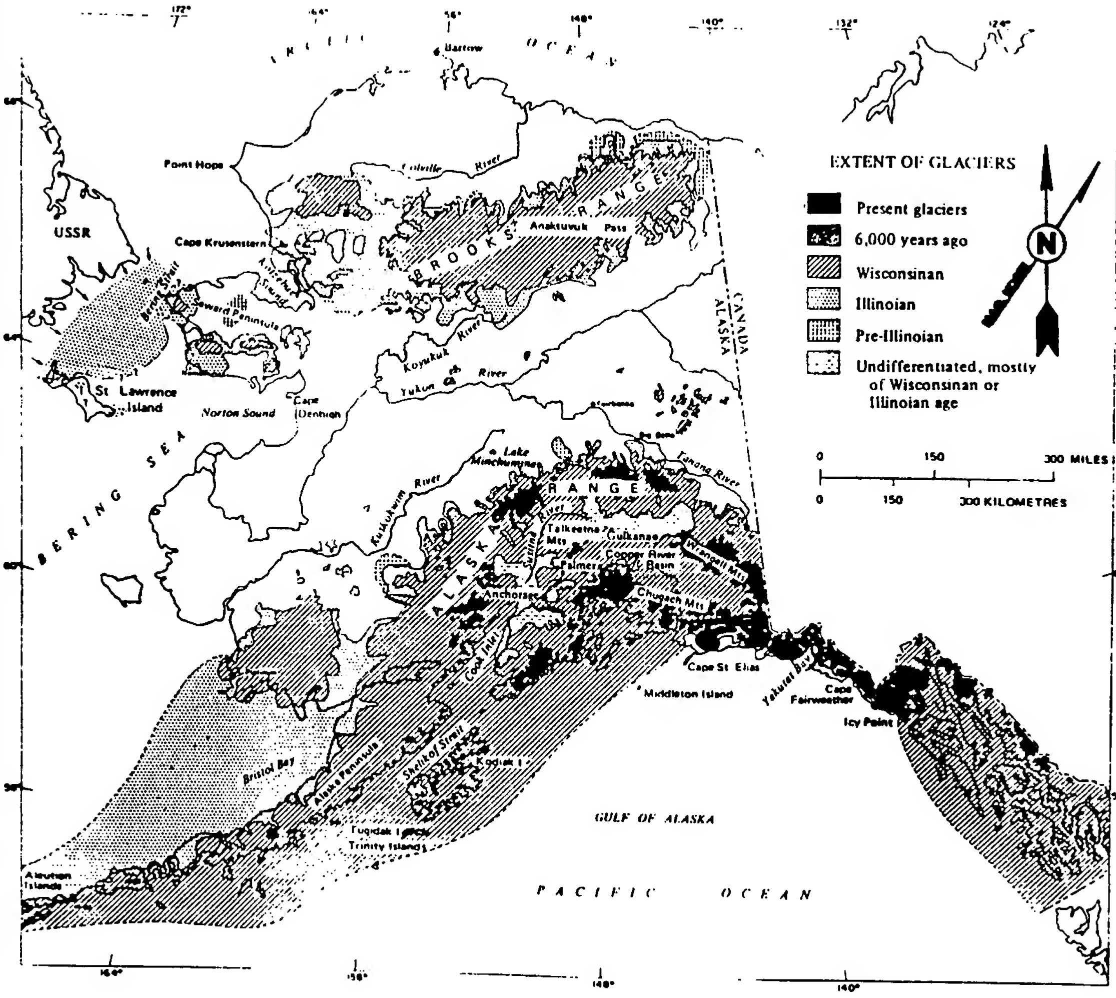

SOURCE: Pewe 1975

ALASKA REMOTE RADAR INSTALLATIONS

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FIGURE NO. 1-4

QUATERNARY GLACIATION IN ALASKA

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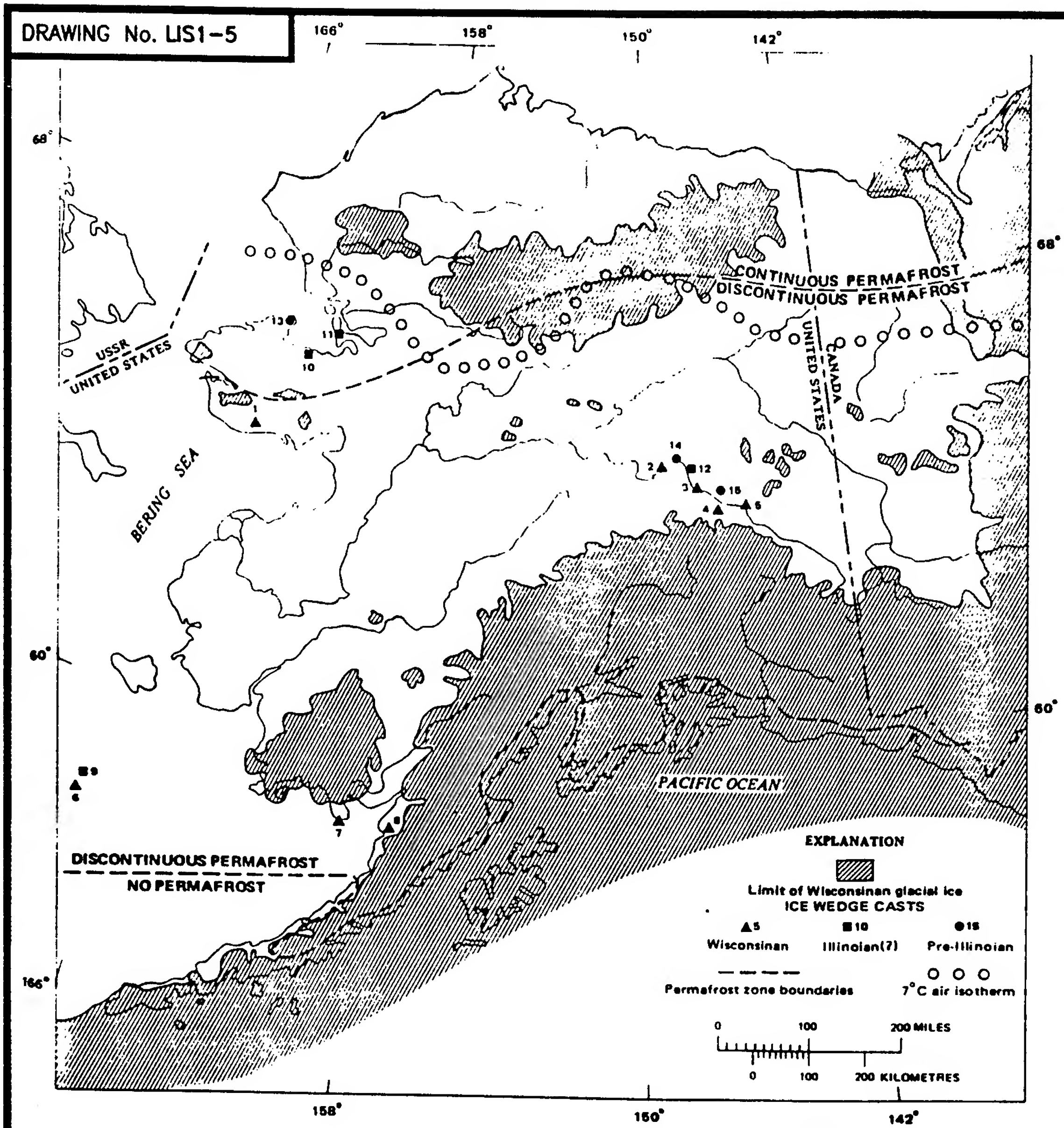
DRAWING No. LIS1-5



SOURCE: Pewe 1975

ALASKA REMOTE RADAR INSTALLATIONS

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FIGURE NO. 1-5

PERMAFROST MAP

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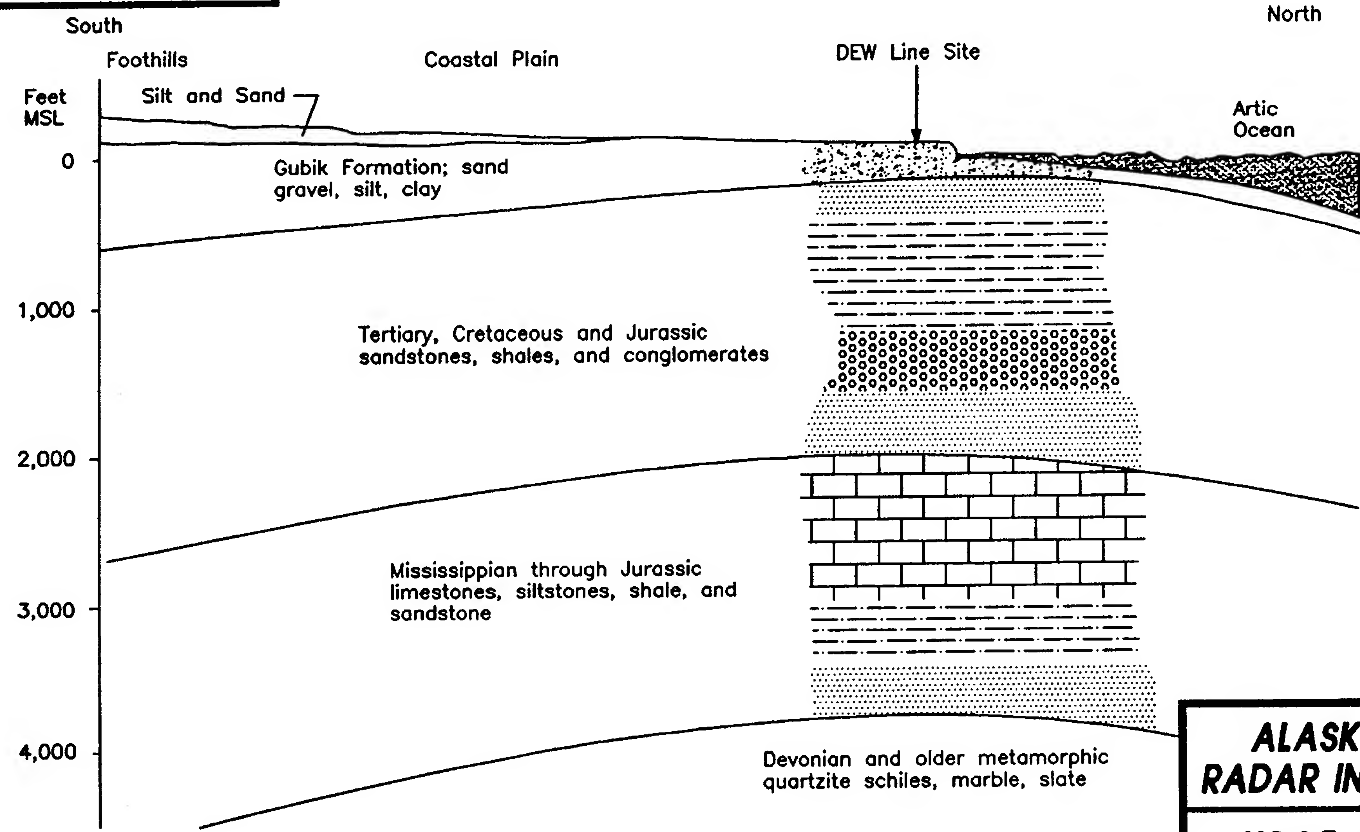

SOURCE: CH2M HILL 1981

Not to Scale

ALASKA REMOTE RADAR INSTALLATIONS

USAF 611th CES

FIGURE NO. 1-6

GENERALIZED NORTH-SOUTH GEOLOGIC CROSS SECTION

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the earth's surface in which a temperature below freezing has existed continuously for a long time (from two years to thousands of years). This definition is based exclusively on temperature and disregards the texture, degree of compaction, water content, and lithologic character of the material.

Permafrost has a major impact on the relationship between surface water and ground water in cold regions such as Alaska. Although ground water in permafrost regions follows the same geologic and hydrologic principles as in temperate areas, the hydrologic regime is modified in the following ways:

- Permafrost acts as an impermeable barrier to the movement of ground water because pore spaces are ice-filled in the zone of saturation. Recharge and discharge are, therefore, limited to unfrozen channels penetrating the permafrost zone. The unfrozen channels are termed perforating taliks. Permafrost restricts the downward percolation of water and increases runoff, enhancing the creation of lakes and swamps (Feulner et al. 1971).

- Permafrost zones tend to reduce evapotranspiration. The generally low ground temperatures tend to reduce direct evaporation and transpiration (the escape of moisture through plant tissue into the air). Vegetation growth is enhanced near large surface water bodies where permafrost usually occurs at greater depth.

- Permafrost restricts an aquifer's storage capacity and the number of locations from which ground water may be withdrawn. Subpermafrost ground water occurs beneath the permafrost zone and is usually dependable. Suprapermafrost water occurs in the active zone, above the permafrost table, and tends to be seasonal; it freezes during the cold winter months.

- The ground water temperature varies from 32 to 40.1°F in permafrost regions because of the low ground temperatures (Williams 1970). Water tends to be more viscous in this temperature range and, therefore, moves slower than in temperate regions.

Low ground temperatures create the necessary environment for permafrost to form. The segment above the permafrost table is called the active zone, because it freezes and thaws with seasonal weather changes. The permafrost zone remains frozen year-round. The active zone is significant because suprapermafrost active zone water exists within it.

Ground water has been found in aquifers beneath the continuous permafrost, but little is known of these aquifer systems. Shallow ground water sources are also present in river gravel and in thaw bulbs beneath deep lakes. Active-zone water is found during the summer months when this layer thaws, but the layer is relatively thin. The thickness of the active zone at Wainwright is estimated to range from one to six feet.

Surface features may have dramatic impacts on the subsurface distribution of permafrost because they influence heat transfer. Heat flow through surface water is greater than through land. Permafrost may be discontinuous or present at greater depth under and near large bodies of water such as rivers or deep lakes. Smaller bodies of water may affect the configuration of the permafrost surface or the total thickness of the permafrost at any given point. Figure 1-7 is a generalized representation of the relationship of surface features to the underlying permafrost.

1.2.4.2 Surface Water. Surface water flow in non-patterned ground areas is largely suprapermafrost sheet flow that channels into numerous small creeks flowing into Wainwright Inlet, a brackish to saline water body up to 16 feet deep, 6.4 miles long, and 3.5 miles wide. The area surrounding the station is drained by the Sinaruruk River, the Omikak Creek, and their tributaries. The Sinaruruk River is five miles north and Omikak Creek is two miles south of the station. The relatively shallow Kuk River, which flows north into Wainwright Inlet, is from 7 to 12 feet deep and 1.7 miles wide near the station. The surface water drainage features in the vicinity of the installation are shown on Figure 1-8.

Potable water is supplied by two unnamed lakes. Water is hauled from a small lake approximately 4,000 feet to the north during the summer. In winter this lake freezes to the bottom, and water is then hauled from a larger and deeper lake east of the facility.

1.2.5 Industrial Activities

The Wainwright radar installation was constructed as an auxiliary DEW Line station. It consists of one module train, rotating radar, and support facilities. The module train houses the electric equipment work areas, the radar tower, a power plant, a limited number of personnel quarters, administration offices, a mechanical room with emergency boiler and fuel storage, and dining, kitchen, and recreation areas. The inactive rotating radar is in the radome adjacent to the module train and is supported by steel columns and trusses. Aircraft facilities include a 3,500-foot long runway just north of the installation. These facilities have been inactive since 1989.

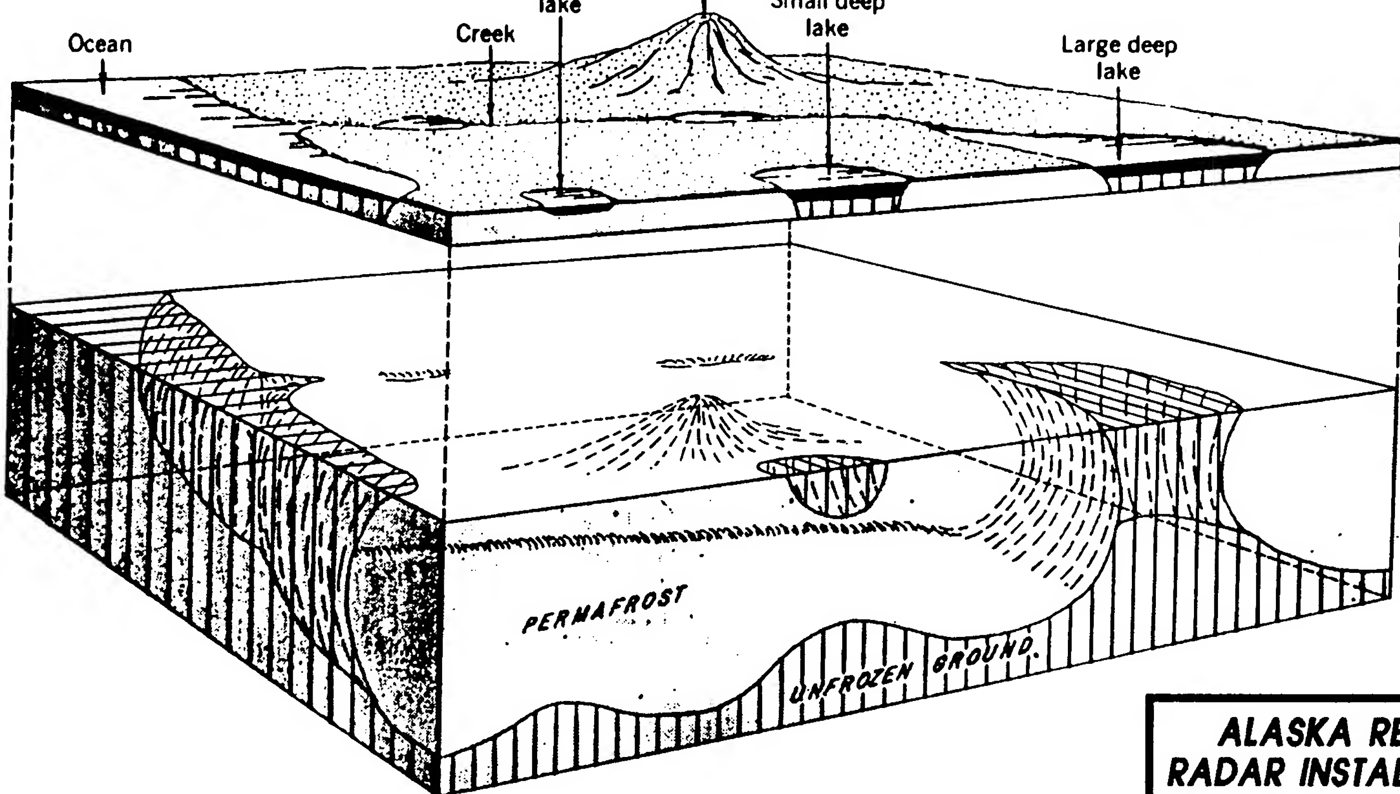
The unmanned SRR system that was being constructed during the 1993 RI activities is currently operational. The installation is unmanned except for periodic maintenance of the active radar system. There are no oil and gas exploration or production activities within the vicinity of the Wainwright radar installation.

1.2.6 Biology

This section presents information on the regional fauna and flora of the Wainwright area.

1.2.6.1 Vegetation. Wet sedge meadows set in thermokarst topography typical of the arctic plain dominate the area. The wet sedge meadow (tundra) vegetation consists mainly of mosses, *Sphagnum* spp.; lichens, *Cetraria* and *Alectoria* spp.; cottongrass, *Eriophorum* spp.; sedges, *Carex* spp.; rushes, *Luzula arctica* and *Juncus biglumis*; and willow, *Salix* spp. High center ice wedge polygons provide a drier environment where grass species such as pendant grass, *Arctophila fulva,* are common (Radian 1989; Hart Crowser 1987).

DRAWING No. LIS1-7



SOURCE: Selkregg 1975

ALASKA REMOTE RADAR INSTALLATIONS

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FIGURE NO. 1-7

SURFACE FEATURE IMPACTS ON PERMAFROST DISTRIBUTION

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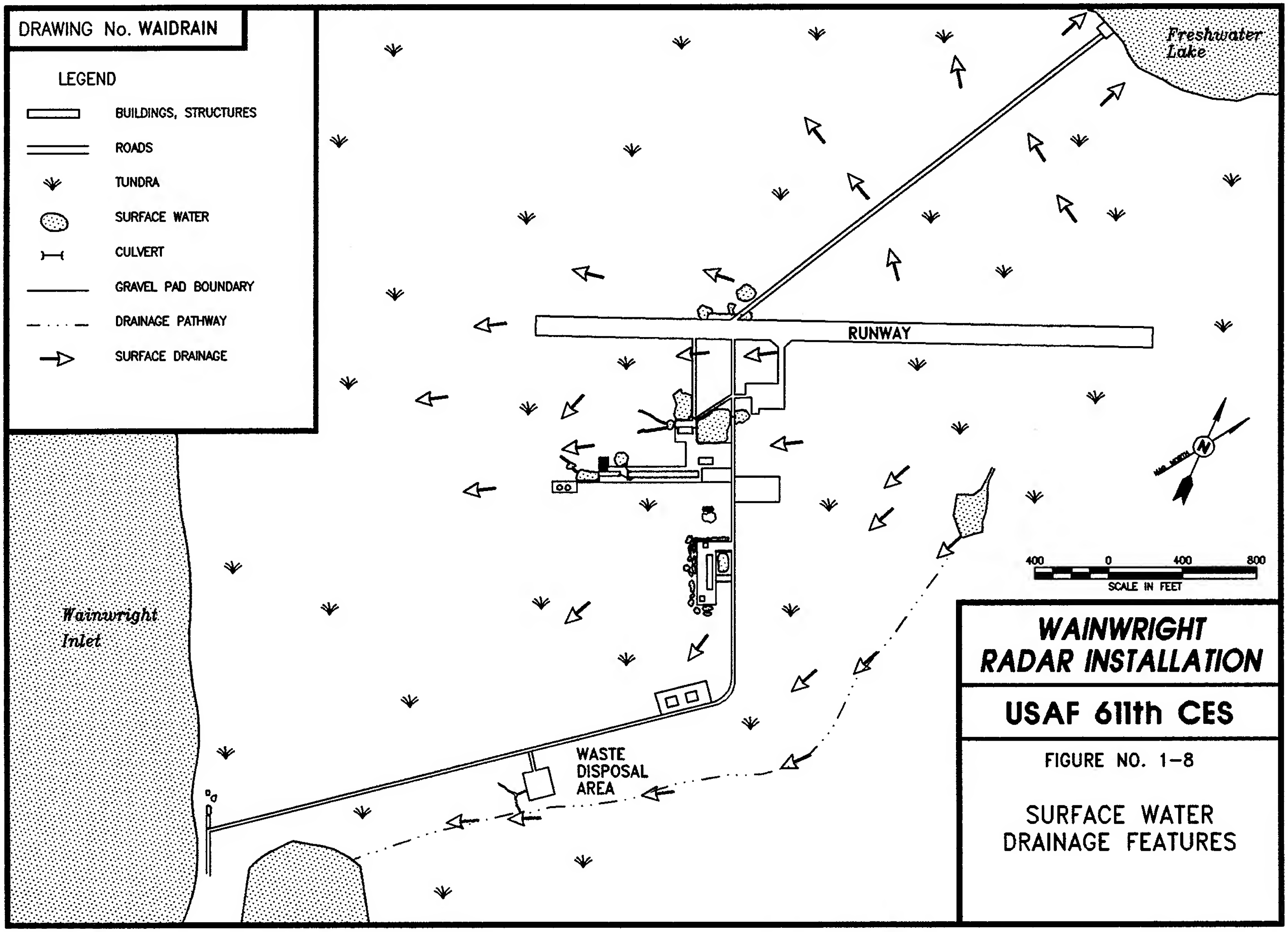
DRAWING No. WAIDRAIN
LEGEND
BUILDINGS, STRUCTURES
ROADS
TUNDRA
SURFACE WATER
CULVERT
GRAVEL PAD BOUNDARY
DRAINAGE PATHWAY
SURFACE DRAINAGE
Freshwater Lake
RUNWAY
Wainwright Inlet
WASTE DISPOSAL AREA
N
400 0 400 800
SCALE IN FEET
WAINWRIGHT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 1-8
SURFACE WATER DRAINAGE FEATURES

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1.2.6.2 Fishes. Typical anadromous fish species of the Kuk River include salmon, *Oncorhynchus* spp.; arctic cisco, *Coregonus autumnalis*; whitefish, *Coregonus* spp.; and smelt, Osmeridae family. Nine-spined stickleback, *Pungitius pungitius*, and Alaska blackfish, *Dallia pectoralis*, are likely to be present in wetlands, ponds, and thaw lakes (Hart Crowser 1987). These waters also have seasonal significance for the spawning, rearing, and feeding activities of other fish species.

1.2.6.3 Birds. The Wainwright radar installation is located along the migratory corridor for shorebirds and waterfowl. The nearby environments provide ample breeding habitat for numerous species including loons, *Gavia* spp.; whistling swan, *Olor columbianus*; jaegers, *Stercorarius* spp.; gulls, *Larus* spp.; arctic tern, *Sterna paradisaea*; ptarmigan, *Lagopus* spp.; snow bunting, *Plectrophenax nivalis*; and Lapland longspur, *Calcarius lapponicus*. Eiders, *Somateria* spp., are known to nest in the area. Ducks and geese, particularly brant, *Branta bernicla*, are important subsistence species. Peregrine falcon, *Falco peregrinus tundrius*, nesting areas have been documented at the headwaters of the Kuk River.

1.2.6.4 Mammals. Marine mammals occurring in the waters near the installation include bowhead whale, *Balaena mysticetus*; gray whale, *Eschrichtius robustus;* beluga whale, *Delphinapterus leucas*; walrus, *Odobenus rosmarus*; bearded seal, *Erignathus barbatus*; and ringed seal, *Phoca hispida*. Polar bear, Ursus maritimus, are reported to range throughout the area during the winter [National Petroleum Reserve in Alaska (NPRA) Task Force 1978], but there is no indication of local denning activities.

Terrestrial mammals include species representative of moist-wet tundra associations such as shrews, *Sorex* spp.; lemmings, *Lemmus* and *Dicrostonyx* spp.; microtine rodents, *Microtus* spp.; ground squirrels, *Spermophilus* spp.; arctic fox, *Alopex lagopus*; and weasels, *Mustela* spp. (Hart Crowser 1987). The brown lemming, *L. trimucronatus*, is the dominant herbivore in the wet sedge meadows. Many predator species are dependent on the lemming for survival.

Barren-ground caribou, Rangifer tarandus, calving activity in the vicinity of the Wainwright installation appears to be concentrated south along the Utukok River (Cuccarese et al. 1984). The area adjacent to the installation is used by caribou during post-calving movements and dispersal. Over-wintering is reported to occur in an area south of the Kuk River.

1.2.6.5 Threatened and Endangered Species. Species of the Arctic Coastal Plain and nearby waters that are protected by federal and state designations include bowhead whale (endangered); fin whale, *Balaenoptera physalus* (endangered); sei whale, *Balaenoptera borealis* (endangered); and humpback whale, *Megaptera novaengliae* (endangered). The gray whale was delisted by the National Marine Fisheries Service as of 16 June 1994. Avian species include the spectacled eider, *Somateria fischeri* (threatened), and Steller's eider, *Polysticta stelleri* (candidate for listing). Based on surveys performed by Alaska Biological Research (1994), there is a low potential for either species of eider to occur at the Wainwright installation. A review of state and federal lists of threatened and endangered plant species indicates that no listed plant species are found at the Wainwright installation.

1.2.7 Demographics

The Wainwright radar installation has been inactive since 1989. The town of Wainwright is located 4.5 miles northwest of the installation. Air travel provides the only year-round access to the area. Marine transport is available from about mid-July to September or October when the ice-free period occurs. No roads link the area to other communities.

1.2.7.1 Local Economy. The present village of Wainwright was established after the Alaska Native Services built a school and clinic shortly after the turn of the century. Approximately 94 percent of the 492 people who live in Wainwright are Alaskan natives (Alaska Department of Labor 1990). Many of the jobs in the community are local and federal government jobs. These include North Slope Borough (NSB) Capitol Improvement Projects (CIP) (construction); and NSB police department, fire department, schools, health clinics, water treatment plant, and social service office. Other jobs include working at the stores and movie theater. Wage-paying jobs were introduced to the subsistence-based lifestyle with the passage of the Alaska Native Claims Settlement Act in 1971. Caribou, whales, marine mammals, and fish are still important natural resources to this community. Wainwright became a city in 1972. It is governed by a council-mayor system with the mayor being appointed by the council. Wainwright is 4.5 miles from the DEW Line installation and is not connected to the installation by a road.

1.2.7.2 Cultural Resources. Several sites of traditional importance have been documented in the Wainwright area (Table 1-1). Most of these are traditional land use areas. These sites have not been evaluated for listing in the National Register of Historic Places.

1.2.7.3 Recreation. Recreation around the Wainwright area is minimal due to limited facilities, accommodations, and transportation. Other than a new hotel owned by the Olgoonik Corporation, the closest accommodations are in Barrow, about 90 miles east. Hunting, fishing, and camping are common, but these activities are usually subsistence-oriented and not considered recreational by the natives. Residents engage in snowmobiling and dog sled racing; however, most recreational activities take place indoors at facilities such as churches, the community hall, the National Guard Armory, and the school. Bingo is a major recreational activity of the local community; proceeds are used to fund projects and special events.

1.3 SITE INVENTORY

This section presents information on the IRP sites at the Wainwright radar installation. It includes summaries of previous IRP activities and remedial actions that have been conducted at the installation.

1.3.1 Sites at Wainwright

Six sites at the Wainwright radar installation were investigated during the 1993 RI activities. Five sites were determined to be of concern based on previous IRP sampling data. Additionally, there was one site identified for investigation based on previous IRP activities and the 1993 RI activities. The five sites previously sampled are the Diesel Fuel Spill (SS04), Landfill (LF05), Garage (SS07),

TABLE 1-1. KNOWN CULTURAL RESOURCE SITES IN THE VICINITY OF WAINWRIGHT RADAR INSTALLATION[a]

SITE NAME	TLUI #[b] AHRS #	DESCRIPTION	LOCATION
Siksrigak	30 --	Mythological significance.	Immediate vicinity of the Wainwright installation.
Tutulivik	31 --	Trapping, hunting area.	1.5 miles south of the Wainwright installation.
Kagmak Point	74 --	Fishing, hunting, camping area.	Three miles southwest of the Wainwright installation.
Uminmak River	32 --	Sod house ruins with bone remains; trapping area.	Five miles southeast of Wainwright on Uminmak River.
Kignigsrak	27 --	Four sod house ruins.	Six miles northwest of the Wainwright installation; near Wainwright Inlet.
Iglugparak	34 --	Coal reserve exploited until 1965.	Six miles southeast of the Wainwright installation, near Kuk River.
Pagualuk	35 --	Grave site.	Seven and a half miles southeast of the Wainwright installation, near Kuk River.
Ahaliraq	20 WAI-017	Old village of Wainwright; last occupied 1902 - 1906; seven sod structures extant.	Eight miles northwest of the Wainwright installation, near Wainwright.
Agthagakviitch	36 --	Fishing, hunting, camping area.	Nine miles southeast of the Wainwright installation, near Kuk River.
Nullagiak	37 --	Sod house ruins with bone remains.	Eleven miles southeast of Wainwright, near Kuk River.

a Data from Ivie and Schneider (1978); Alaska Division of Geological and Geophysical Surveys (1984).

b TLUI = Traditional Land Use Inventory.
AHRS = Alaska Heritage Resources Survey.

Source: Hart Crowser 1987

Airstrip Diesel (SS08), and Vehicle Storage Area (SS09). Previous IRP sampling at these areas determined that contaminants were present. An additional site was identified based on previous IRP activities and the 1993 RI activities as listed: literature search, pre-survey and reconnaissance, interviews with station personnel, communication with personnel from the State of ADEC, and information on disposal practices at DEW Line stations. The additional site is the Drum Storage Area (ST02). Prior to this RI/FS, no sampling had been conducted at the site.

It should be noted that none of the six sites is on, or is proposed for inclusion on, the national priority list (NPL) of Superfund sites.

1.3.2 Previous IRP Activities

An Air Force contractor conducted Phase I Installation Assessment/Records Search activities at the Wainwright radar installation and six other DEW Line stations in 1980 and 1981 (CH2M Hill 1981). Phase I activities included a detailed review of pertinent installation records from both government and civilian contractors, contacts with various government and private agencies for documents relevant to the program, and onsite visits during July and August 1981. The onsite visits included interviews with key station employees, ground tours of station facilities, and plane overflights to identify past disposal and possible contaminated areas.

In January 1987, an Air Force contractor released the Environmental Assessment for North Warning System (Alaska) (Hart Crowser 1987). The assessment, although not an IRP activity, discussed the impacts of the construction of an SRR station at the Wainwright DEW Line installation.

An Air Force contractor released the Final Technical Support Document for the Record of Decision, LIZ-3 DEW Line site in 1987 (Woodward-Clyde 1987). The Record of Decision, applicable to five potential hazardous waste sites identified at the Wainwright installation, called for no further action with regard to investigation or cleanup, based on the assessment that there is no significant impact on human health or the environment from suspected or confirmed past contamination at the installation.

In 1989, implementation of plans for the scheduled closure of the Wainwright installation was initiated. In conjunction with the proposed station closure, an Air Force contractor released an Environmental Impact Assessment for the Wainwright installation (Radian 1989). The Environmental Impact Assessment involved a records search, interviews with installation personnel, photo documentation, an installation survey, an electromagnetic survey to detect buried metal objects, and analyses for heavy metals, hydrocarbons, VOCs, priority pollutants, and PCBs in soil and surface water. The installation was scheduled for closure in September 1989.

In preparation for construction activities associated with the proposed SRR station at Wainwright, an Air Force contractor conducted a hydrocarbon soil sampling program (ENSR 1992). A total of 441 screening samples and 68 analytical samples was taken at the formerly active Wainwright installation. Petroleum hydrocarbons were detected in some soil samples; complete results are described in the report. Construction of the SRR System was initiated in 1992 and was completed in 1994.

1.3.3 Previous Remedial Actions

Previous IRP investigations conducted at the Wainwright installation have not determined the need for remedial actions at any of the sites investigated. Therefore, no previous remedial actions have been conducted at the installation.

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2.0 PROJECT ACTIVITIES

This section of the report describes the project objectives and scope, the RI field program and methodology, the analytical programs, background sampling, and analytical results. In addition, data evaluation, risk estimation methodologies, potential migration pathways, and receptors are presented.

2.1 PROJECT OBJECTIVES AND SCOPE

The objectives of the Wainwright DEW Line radar installation RI/FS are to confirm the presence or absence of chemical contamination in the environment at the installation; define the extent and magnitude of confirmed chemical releases; gather adequate data to determine the magnitude of potential risks to human health and the environment; and gather adequate data to identify and select the appropriate remedial actions for sites where apparent risks exceed acceptable limits or contamination exceeds regulatory guidelines. The project objectives include the following goals:

- Define the horizontal and vertical extent of soil contamination and the range of contaminant concentration;
- Determine the physical and chemical properties of soil contaminants to describe contaminant toxicity and mobility;
- Define the extent of surface and active zone water contamination and the range of contaminant concentrations;
- Describe real and potential surface and subsurface contaminant migration pathways in terms of movement of dissolved and suspended contaminants through the active zone above permafrost, and movement of dissolved and suspended contaminants in surface water;
- Generate adequate valid data to support development of a baseline risk assessment that quantifies, to the extent possible, potential risks to human health and the environment posed by COCs at the Wainwright DEW Line installation studied under this RI; and
- Select the most feasible remedy (cleanup action) to reduce risks at sites where risks exceed acceptable limits.

2.2 RI FIELD ACTIVITIES

This section presents a summary of the field activities conducted during the RI, the organization of the RI field team, and the chronology of field work.

2.2.1 RI Field Program

The RI field program at the Wainwright radar installation was carried out in accordance with the RI/FS Work Plan, the SAP, and the Health and Safety Plan (U.S. Air Force 1993a,b,c). These RI/FS planning documents were developed as specified in the Delivery Order No. 22 Statement of Work (Appendix C) and IRP Handbook (U.S. Air Force 1991).

The scope of the field investigation was described in detail in the Field Sampling Plan (U.S. Air Force 1993b). The field activities included the following:

- Collecting and analyzing surface and subsurface soil/sediment samples from sites with potential or confirmed soil/sediment contamination. These soil/sediment samples were described and analyzed for petroleum and other chemical residues. Samples were collected using hand tools.

- Collecting and analyzing samples of surface water from potentially affected streams, surface water features such as lakes or ponds, and any apparent leachate discharge points.

- Collecting and analyzing background samples to characterize natural background conditions.

- Measuring relative surface elevations of sampling points and stream channels to determine surface slopes and stream gradients.

- Collecting samples of potential chemical residues and waste materials at sites where such materials were suspected and had not yet been characterized.

- Conducting real-time air monitoring using portable field instruments.

- Measuring surface distances and approximate elevations to locate sampling points relative to fixed reference points.

The RI activities described above were carried out in three phases as follows:

- Installation Pre-survey. The pre-survey was conducted by a small group of contractor employees (four total) accompanied by Air Force representatives. The purpose of the pre-survey was to confirm the location of areas of environmental concern at the installation. Pre-survey activities were limited to visual inspection of the sites, surface distance measurements, site photography, and confirmation of the location of structures and sites as shown on installation plan maps. The information gathered from the pre-survey was combined with existing documentation to support development of the RI/FS scoping documents. The pre-survey was completed at the Wainwright installation on 13 May 1993 by an Air Force contractor.

- Installation Reconnaissance. The installation reconnaissance was conducted by a group of contractor employees on 24 June 1993. The purpose of the reconnaissance was to identify sampling locations for investigation during the RI. The contractor staff made detailed observations of potentially contaminated areas and performed limited intrusive activities (e.g., digging shallow holes with a shovel to determine the apparent depth of contamination at areas of soil staining). Data gathered during the installation reconnaissance provided the basis for determining the sites to be sampled, the approximate number of samples and their locations, analyses for each sample, and equipment and supply needs for the RI.

- Remedial Investigation/Field Activities. The RI field activities were conducted from mid-August through early September of 1993. The RI was conducted in conjunction with RIs at seven other radar installations located throughout northern Alaska. Fifteen contractor employees were stationed in Alaska for the duration of the RI. Sampling activities at the Wainwright radar installation included collection of surface and subsurface soil samples with hand tools (e.g., shovels, scoops, bucket augers) and collection of surface water, bottom sediment, and seep samples from drainages adjacent to landfills and potential chemical discharge areas. The RI activities also included operation of temporary northern Alaska (Barrow, Alaska) laboratory facilities operated by a subcontractor.

2.2.2 Field Team Organization and Subcontractors

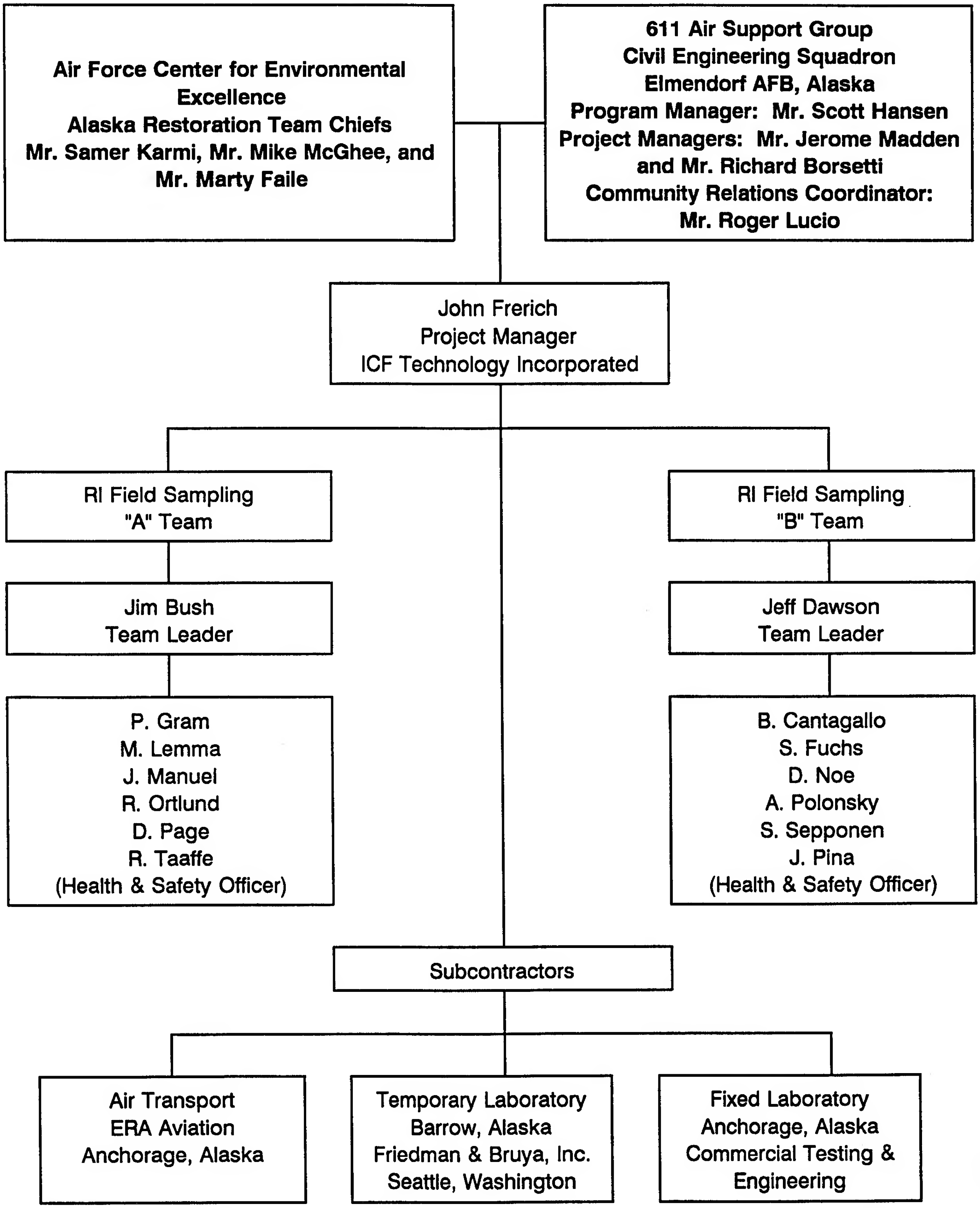
The organization of the RI field team, the responsibilities of the RI team members, and subcontractors used during RI activities are presented in Figure 2-1 (Note: all Wainwright sampling was conducted by the A RI Field Sampling Team). The AFCEE restoration team chiefs that managed and conducted oversight of the RI field activities included Mr. Marty Faile, Mr. Mike McGhee, and Mr. Samer Karmi.

2.2.3 Chronology of Field Work

The RI field work at the Wainwright radar installation conducted during summer 1993 was accomplished in the following chronological order:

13 May	Conducted pre-survey.
24 June	Conducted reconnaissance.
28 August	Stockpiled RI sampling supplies at Wainwright radar installation.
29 August	Staked all sampling locations. Collected two soil samples and one water sample for background (BKGD), five soil samples at ST02, six soil and two water samples at LF05, four soil and three water samples at SS08, and six QA/QC samples.

FIGURE 2-1. FIELD TEAM ORGANIZATION



30 August	Collected nine soil and three water samples at SS04, six soil and three water samples at SS07, seven soil samples and one water sample at SS09, and six QA/QC samples.
07 September	Collected two soil samples and one water sample for background (BKGD), two soil samples at SS04, two soil and two water samples at SS07, two soil samples and one water sample at SS09, two stockpiled soil samples (STKP), and three QA/QC samples.

2.3 RI SAMPLING AND ANALYSES

A summary of the RI sampling and analysis activities conducted during this investigation is presented in this section. Included are descriptions of the number of samples collected by media, QA/QC samples collected, background sampling and analyses, analytical programs, chronology of laboratory analyses, laboratory QA/QC programs, and data validation and reporting.

2.3.1 Sampling Procedures

Contractor personnel collected samples from various media at the Wainwright radar installation using numerous sample collection methods and procedures. The collection methods were determined at the time of collection, based on sample location and prevailing environmental conditions. Media sampled during the RI included surface and subsurface soils, surface water, and sediment. These media were extracted generally from man-emplaced fill, gravel pads, and scraped areas; and natural tundra soils/sediments and surface water bodies. All sampling tools or other devices used during sampling were decontaminated before use. Standard procedures, developed by the contractor for sampling methodologies used during the RI are presented in Appendix D of the RI/FS SAP (U.S. Air Force 1993b). Sample collection logs for all samples collected during RI activities at the Wainwright installation are presented in Appendix D. The logs provide detailed sample information such as media, location, depth, and analyses requested. Completed chain-of-custody forms for all samples collected during the RI at the Wainwright installation are presented in Appendix E.

2.3.2 Summary of RI Sampling

Contractor personnel collected 81 samples from various media at the Wainwright radar installation. Six samples were collected to determine organic and inorganic background concentrations in soil/sediment and surface water. Fifteen samples were collected for QA/QC. QA/QC samples included duplicates, replicates, equipment rinsate blanks, trip blanks, and ambient condition blanks. Sixty samples were collected to determine the nature and extent of contamination at the six sites at Wainwright. Table 2-1 presents a summary of RI sampling conducted at Wainwright.

2.3.2.1 Field QA/QC Samples. The field QA/QC program consisted of QA/QC samples, QC checks, and limits for field procedures.

TABLE 2-1. SUMMARY OF WAINWRIGHT REMEDIAL INVESTIGATION FIELD SAMPLING ACTIVITIES

ACTIVITY	TOTAL
Water Samples Collected for Lab Analyses (includes QA/QC)	27 samples
Soil/Sediment Samples Collected for Lab Analyses (includes QA/QC)	54 samples
Drums of Investigation Derived Waste Generated (one drum water)	0 samples[a]
TOTAL WATER AND SOIL SAMPLES FOR LAB ANALYSES	81 samples

a Investigation-derived waste for the Wainwright installation was combined with investigation-derived wastes from Point Lay, Point Barrow, and Point Lonely. These were collectively sampled during the Point Barrow investigation.

QA/QC Samples. QA/QC samples collected during this investigation included duplicate water samples, replicate soil/sediment samples, trip blanks, ambient condition blanks, and equipment rinsate blanks.

During RI sampling activities at the Wainwright installation, QA/QC samples collected included the following: three duplicate water samples, five replicate soil/sediment samples, three trip blanks, one ambient condition blank, and three equipment rinsate blanks. Table 2-2 summarizes all samples collected and analyzed during RI activities at the installation, including the QA/QC samples.

In addition to the above QA/QC samples, extra volumes of selected samples were collected and submitted for internal laboratory QA/QC (matrix spike and matrix spike duplicates). Extra sample volumes were submitted at a minimum of 1 per 10 samples. Extra volumes submitted included triple volume for organic water analyses and double volume for inorganic water analyses.

2.3.2.2 Background Sampling and Analyses. Six background samples were collected from upgradient areas during field activities at the Wainwright radar installation to establish background concentrations for naturally occurring organic compounds. In order to obtain a representative range of inorganic (metal) concentrations in soil/sediments and surface waters of the North Slope, 44 samples (29 soil/sediment and 15 water) from seven North Slope radar installations were collected. The seven installations include Barter Island, Bullen Point, Oliktok Point, Point Lonely, Point Barrow, Point Lay, and Wainwright. Approximately five soil/sediment and two surface water background samples were collected from each of these installations to determine the background concentrations of inorganic analytes across similar coastal arctic environments of the North Slope.

Six background samples were collected from tundra and pond areas during the RI at Wainwright. These consisted of two soil, two sediment, and two surface water samples.

TABLE 2-2. SUMMARY OF SAMPLING AND ANALYSES CONDUCTED FOR W

ANALYSES	HVOC*	BTEX*	VOC 8260	SVOC	Metals[b]	TPH-Diesel[b] Range 3510/3550	TPH - Gasoline[b] Range	T Res Ra
ANALYTICAL METHOD	SW8010M	SW8020	SW8260	SW8270	SW3050 (Soil) 3005 (Water)/6010	Diesel 8100M	Gas 5030/8015M	Diese
WAINWRIGHT (LIZ-3)								
Background (BKGD)	4 Soil 2 Water	4 Soil 2 Water	4 Soil 2 Water	4 Soil 2 Water	4 Soil 2 Water (Total) 2 Water (Dissolved)	4 Soil 2 Water	4 Soil 2 Water	4 2 V
Drum Storage Area (ST02)	5 Soil	5 Soil	2 Soil	2 Soil	2 Soil	5 Soil	5 Soil	5
Diesel Fuel Spills (SS04)	NA	9 Soil 3 Water	2 Soil 1 Water	1 Water	NA	12 Soil 3 Water	10 Soil 3 Water	11 3 V
Landfill (LF05)	6 Soil 2 Water	6 Soil 2 Water	2 Soil 2 Water	2 Soil 2 Water	2 Soil 2 Water (Total) 2 Water (Dissolved)	6 Soil 2 Water	6 Soil 2 Water	6 2 V
Garage (SS07)	6 Soil	6 Soil 3 Water	2 Soil 2 Water	2 Water	2 Soil 2 Water (Total) 2 Water (Dissolved)	9 Soil 5 Water	7 Soil 3 Water	8 5 V
Airstrip Diesel Spill (SS08)	NA	4 Soil 3 Water	1 Soil 1 Water	1 Water	NA	4 Soil 3 Water	4 Soil 3 Water	4 3 V
Vehicle Storage Area (SS09)[c]	11 Soil 2 Water	11 Soil 2 Water	4 Soil 2 Water	2 Soil 2 Water	4 Soil 2 Water (Total) 2 Water (Dissolved)	11 Soil 2 Water	11 Soil 2 Water	11 2 V
Total Field Analyses	32 Soil 6 Water	45 Soil 15 Water	17 Soil 10 Water	10 Soil 10 Water	14 Soil 8 Water (Total) 8 Water (Dissolved)	51 Soil 17 Water	47 Soil 15 Water	49 17
QA/QC SAMPLES								
Trip Blanks	3 Water	3 Water	3 Water	NA	NA	NA	3 Water	
Equipment Blanks	3 Water	3 Water	2 Water	2 Water	3 Water (Total)	3 Water	3 Water	3 V
Ambient Condition Blanks	1 Water	1 Water	NA	NA	NA	NA	1 Water	
Field Replicates	3 Soil	4 Soil	2 Soil	1 Soil	1 Soil	5 Soil	4 Soil	5
Field Duplicates	NA	2 Water	1 Water	1 Water	NA	3 Water	2 Water	3 V
Total Site Analyses	35 Soil 10 Water	49 Soil 24 Water	19 Soil 16 Water	11 Soil 13 Water	15 Soil 11 Water (Total) 8 Water (Dissolved)	56 Soil 23 Water	51 Soil 24 Water	54 23

NA Not analyzed.
* These analyses were completed on a quick turnaround basis.
a The number of soil sample includes sediment samples collected from surface water features.
b Some of these analysis were completed on a 24-hour turnaround at a temporary fixed laboratory at Barrow, Alaska.
c Stockpiled soils located in the vicinity of the Vehicle Storage Area were sampled in conjunction with this site.
d Investigation derived wastes from Wainwright were combined with the investigation derived wastes from Point Lay, Point Barrow, a

ONDUCTED FOR WAINWRIGHT REMEDIAL INVESTIGATIONS[a]

TPH - Gasoline[b] Range	TPH Residual Range*	PCB*	Pesticides*	TDS	TSS	TOC	TCLP[d]	TOTAL SAMPLES
Gas 5030/8015M	Diesel 8100M	SW8080/8080M	SW8080/8080M	E160.1	E160.2	SW9060	SW1311	
4 Soil 2 Water	4 Soil 2 Water	4 Soil 2 Water	4 Soil 2 Water	2 Water	2 Water	4 Soil 1 Water	NA	4 Soil 2 Water
5 Soil	5 Soil	5 Soil	NA	NA	NA	NA	NA	5 Soil
10 Soil 3 Water	11 Soil 3 Water	5 Soil	2 Soil	1 Water	1 Water	1 Water	NA	11 Soil 3 Water
6 Soil 2 Water	6 Soil 2 Water	6 Soil 2 Water	1 Soil	2 Water	2 Water	2 Soil 2 Water	NA	6 Soil 2 Water
7 Soil 3 Water	8 Soil 5 Water	6 Soil	3 Soil 2 Water	NA	NA	NA	NA	8 Soil 5 Water
4 Soil 3 Water	4 Soil 3 Water	NA	1 Water	1 Water	1 Water	1 Water	NA	4 Soil 3 Water
11 Soil 2 Water	11 Soil 2 Water	7 Soil 2 Water	1 Water	2 Water	2 Water	2 Soil 1 Water	NA	11 Soil 2 Water
47 Soil 15 Water	49 Soil 17 Water	33 Soil 6 Water	10 Soil 6 Water	8 Water	8 Water	8 Soil 6 Water	NA	49 Soil 17 Water
3 Water	NA	NA	NA	NA	NA	NA	NA	3 Water
3 Water	3 Water	3 Water	3 Water	NA	NA	3 Water	NA	3 Water
1 Water	NA	NA	NA	NA	NA	NA	NA	1 Water
4 Soil	5 Soil	4 Soil	NA	NA	NA	NA	NA	5 Soil
2 Water	3 Water	NA	NA	1 Water	1 Water	1 Water	NA	3 Water
51 Soil 24 Water	54 Soil 23 Water	37 Soil 9 Water	10 Soil 9 Water	9 Water	9 Water	8 Soil 11 Water	1 Water	54 Soil 27 Water

ıw, Alaska.
ıite.
Point Lay, Point Barrow, and Point Lonely. These were collectively sampled during the Point Barrow investigation.

Two background soil samples were analyzed for DRPH, GRPH, BTEX, halogenated volatile organic compounds (HVOCs), pesticides, PCBs, VOCs, semi-volatile organic compounds (SVOCs), total metals, and total organic carbons (TOC).

Two background sediment samples were analyzed for DRPH, GRPH, BTEX, HVOCs, VOCs, pesticides, PCBs, SVOCs, total metals, and TOC.

Two background surface water samples were analyzed for DRPH, GRPH, BTEX, HVOCs, SVOCs, pesticides, PCBs, TOC, total suspected solids (TSS), total dissolved solids (TDS), and total and dissolved metals.

Data Summary. Background sample locations at Wainwright are illustrated in Figure 2-2. The data summary table (Table 2-3) presents analytical results for all background samples collected at Wainwright. Detection and quantitation limits, action levels, and associated field and laboratory blank results are included on the data summary table.

Below is a discussion of organic compounds and inorganic analytes detected in background samples at Wainwright. A discussion of TDS, TSS, and TOC is included. Analytical results are presented in Table 2-3 and Figure 2-2.

Organics. With the exception of di-n-butylphthalate, no organic compound was detected in background samples collected at this installation. Because di-n-butylphthalate is a common laboratory contaminant and was detected in laboratory blanks, the occurrence of this compound is believed to be due to laboratory cross-contamination. It is not believed to be representative of site conditions.

Inorganics. Thirteen metals were detected in background soil/sediment samples at Wainwright. Five of these metals are essential human nutrients, and three are sometimes considered to be essential human nutrients. Six metals were detected in background surface water samples collected at Wainwright, four of which are essential human nutrients. The results of inorganic analyses are presented in Table 3-2.

TOC ranged from 10,500 to 44,100 mg/kg in background soil/sediment samples, and was reported at 7,480 μg/L in the surface water sample BKGD-SW01. TSS were reported at 35,000 and 7,000 μg/L and TDS were reported at 91,000 and 151,000 μg/L in surface water samples BKGD-SW01 and BKGD-2SW02, respectively.

2.3.3 Laboratory Analyses

This section describes the RI analytical program. Summaries of the soil/sediment and water analyses conducted during the RI are presented in Tables 2-4 and 2-5. Table 2-4 presents a description of the soil analytical methods and number of soil samples collected, and Table 2-5 presents a description of the water analytical methods and the number of water samples collected.

2.3.3.1 Analytical Program. Analyses of samples were conducted by a fixed laboratory in Anchorage, Alaska, and a temporary laboratory set up at Barrow, Alaska. The analytical testing conducted by each laboratory is discussed below.

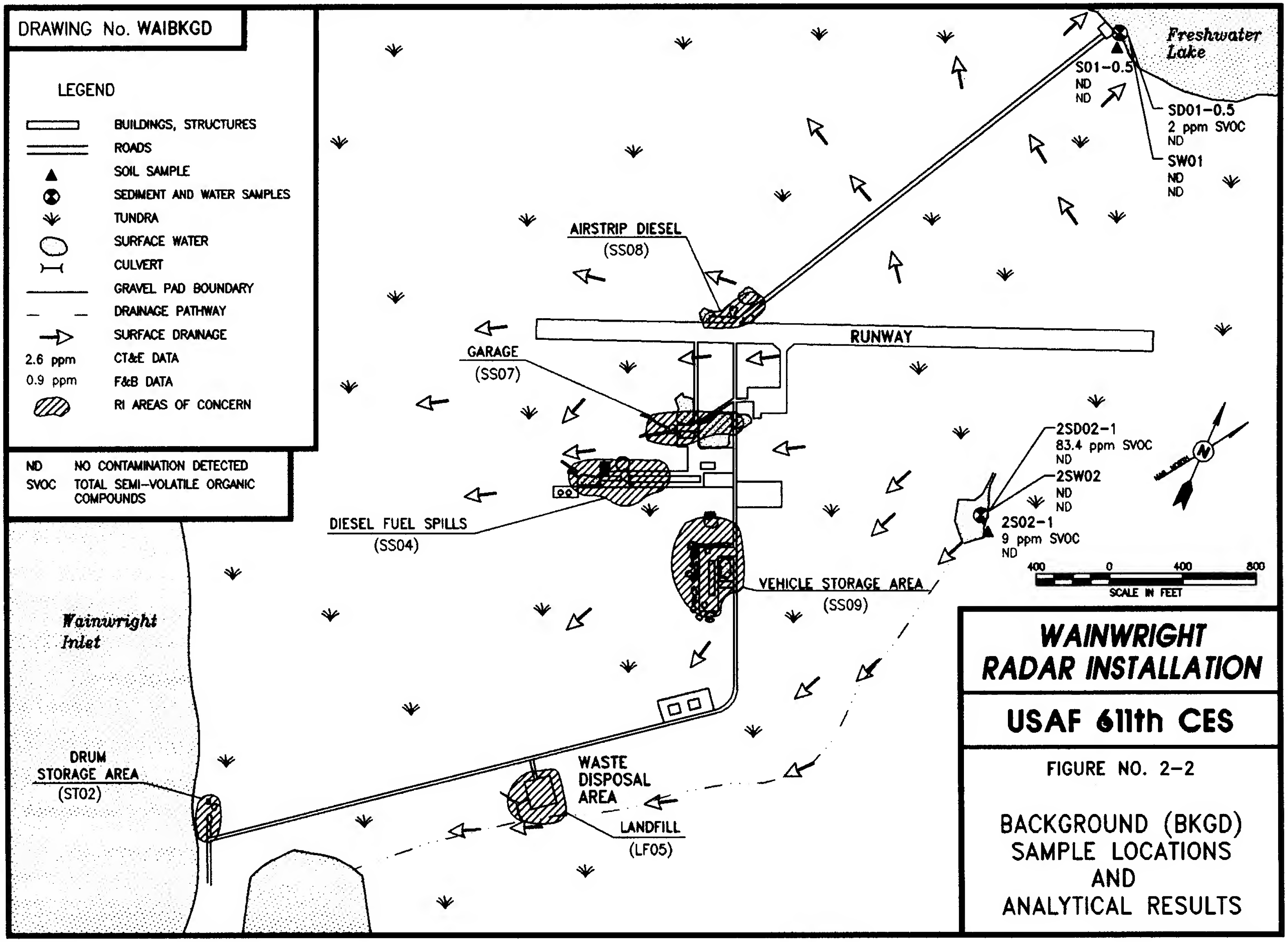

DRAWING No. WAIBKGD
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SEDIMENT AND WATER SAMPLES
TUNDRA
SURFACE WATER
CULVERT
GRAVEL PAD BOUNDARY
DRAINAGE PATHWAY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
RI AREAS OF CONCERN
ND NO CONTAMINATION DETECTED
SVOC TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
Freshwater Lake
S01-0.5
ND
ND
SD01-0.5
2 ppm SVOC
ND
SW01
ND
ND
AIRSTRIP DIESEL
(SS08)
RUNWAY
GARAGE
(SS07)
DIESEL FUEL SPILLS
(SS04)
VEHICLE STORAGE AREA
(SS09)
2SD02-1
83.4 ppm SVOC
ND
2SW02
ND
ND
2S02-1
9 ppm SVOC
ND
400 0 400 800
SCALE IN FEET
Wainwright Inlet
DRUM
STORAGE AREA
(ST02)
WASTE
DISPOSAL
AREA
LANDFILL
(LF05)
WAINWRIGHT
RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 2-2
BACKGROUND (BKGD)
SAMPLE LOCATIONS
AND
ANALYTICAL RESULTS

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TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY

Installation: Wainwright
Site: Background (BKGD)
Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range	Environmental Samples				Field Blanks				Lab Blanks	
					S01-0.5	SD01-0.5	2S02-1	2SD02-1	AB01	EB01	TB01	2EB03		
Laboratory Sample ID Numbers					1236 4479-6	1238 4479-5	1876 4694-4	1874 4694-1	1424	1280/1282 4479-7	1260 4479-8	1894/1896 4695-3	#6-9993 #5-9193 #1&2-9793 #1&2-9293 4695 4479	#6-91093 #6-83193 #3&4-9293 #1&2-91093 4694 4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-30	50-300	500[a]	<50[b]-<300[b]	<50[b]	<60[b]	<75[b]	<300J[b]	NA	<1,000[b]	NA	<1,000J[b]	<1,000	<50J-<50
GRPH	0.1-0.5	1-5	100	<2J[b]-<5J[b]	<2J[b]	<2J[b]	<1J[b]	<5J[b]	<50J[b]	<100J[b]	<100J[b]	<50J[b]	<50J	<1-<2J
RRPH (Approx.)	10-60	100-600	2,000[a]	<100-<600	<100	<120	<200	<600	NA	<2,000	NA	<2,000	<2,000	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.10-<0.5	<0.10	<0.10	<0.15	<0.5						
Benzene	0.002-0.01	0.02-0.1	0.5	<0.02-<0.1	<0.02	<0.02	<0.03	<0.1	<1	<1	<1	<1	<1-<5	<0.02
Toluene	0.002-0.01	0.02-0.1		<0.02-<0.1	<0.02	<0.02	<0.03	<0.1	<1	<1	<1	<1	<1	<0.02
Ethyl-benzene	0.002-0.01	0.02-0.1		<0.02-<0.1	<0.02	<0.02	<0.03	<1	<1	<1	<1	<1	<1	<0.02
Xylenes (Total)	0.004-0.02	0.04-0.2		<0.04-<0.2	<0.04	<0.04	<0.06	<0.2	<2	<2	<2	<2	<2	<0.04
HVOC 8010	0.002-0.05	0.02-0.5		<0.02-<0.5	<0.02	<0.02	<0.1J	<0.5J	<1	<10	<10	<5	<1-<10J	<0.02
VOC 8260	0.020	0.020-0.400		<0.020-<0.400	<0.020	<0.025	<0.060	<0.400J	NA	<1	<1	<1-4.1	<1	<0.020
SVOC 8270														
di-n-Butyl phthalate	0.200	0.200-32.0		1.69U-83.4J	1.69U	2.03B	9.01B	83.4J	NA	<10	NA	<21	<10	0.741-1.41

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
B Analyte was found in the associated blank.
J Result is an estimate.
U Compound is not present above concentration listed.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)

Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range	Environmental Samples				Field Blanks				Lab Blanks	
					S01-0.5	SD01-0.5	2S02-1	2SD02-1	AB01	EB01	TB01	2EB03		
Laboratory Sample ID Numbers					1236 4479-6	1238 4479-5	1876 4694-4	1874 4694-1	1424	1280/1282 4479-7	1260 4479-8	1894/1896 4695-3	#6-9993 #5-9193 4695 4479	#6-91093 #6-83193 4694 4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Pesticides	0.001-0.28	0.01-2.8		<0.01J-2.8J	<0.01J-<0.5J	<0.01J-<0.5J	<0.02J-<0.80J	<0.06J-<2.8J	NA	<0.2J-<10J	NA	<0.2J-<25J	NA	<0.01
PCBs	0.01-0.28	0.1-2.8	10	<0.1-<2.8J	<0.1	<0.1	<0.8J	<2.8J	NA	<2J	NA	<2J	<2	<0.1
TOC				10,500-44,100	10,500	43,300	44,100	19,400	NA	<5,000	NA	<5,000	<5,000	NA

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)

Matrix: Soil/Sediment
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Bkgd. Range from 7 DEW Line Installations	Wainwright Bkgd. Range	Environmental Samples						Field Blanks		Lab Blanks
					S01-0.5	SD01-0.5	2S02-1	2SD02-1			EB01	2EB03	
Laboratory Sample ID Numbers					4479-6	4479-5	4694-4	4694-1			4479-7	4695-3	4479 4695 4694
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			µg/L	µg/L	µg/L
Aluminum	0.35	2	1,500-25,000	1,500-5,900	1,500	1,600	5,900	1,500			<100	<100	<100
Antimony	N/A	7.8-54	<7.8-<230	<7.8-<54	<51J	<54	<7.8	<14			<100	<100	<100
Arsenic	0.11	7.8-51	<4.9-8.5	<5.4-<51	<51	<5.4	<7.8	<14			<100	<100	<100
Barium	0.024	1	27-390	62-120	110	62	120	81			<50	<50	<50
Beryllium	N/A	2.6-71	<2.6-6.4	<2.6-<71	<2.6	<2.7	<3.9	<71			<50	<50	<50
Cadmium	0.33	3.9-71	<3.0-<36	<3.9-<27	<26	<27	<3.9	<7.1			<50	<50	<50
Calcium	0.69	4	360-59,000	360-2,400	720	360	690	2,400J			410	<200	<200
Chromium	0.066	1-7.1	<4.3-47	<7.1-10	<26	<27	10	<7.1			<50	<50	<50
Cobalt	N/A	5.1-14	<5.1-12	<5.1-<14	<5.1	<5.4	<7.8	<14			<100	<100	<100
Copper	0.045	1-7.1	<2.7-45	<2.7-7.2	3.8	<2.7	7.2	<7.1			<50	<50	<50
Iron	0.50	2	5,400-35,000	5,400-16,000	13,000	5,600	5,400	16,000			<100	<100	<100
Lead	0.13	5.1-14	<5.1-22	<5.1-<14	<5.1	<5.4	<7.8	<14			<100	<100	<100
Magnesium	0.96	4	360-7,400	360-1,200	360	400	1,200	510			<200	<200	<200
Manganese	0.025	1	25-290	25-44J	44J	25	29	28			<50	<50	<50
Molybdenum	N/A	2.6-7.1	<2.5-<11	<2.6-<7.1	<2.6	<2.7	<3.9	<7.1			<50	<50	<50
Nickel	0.11	1	4.2-46	4.4-8.9	5.6	4.4	7.6	8.9			<50	<50	<50
Potassium	23	100-710	<300-2,200	<710-540	400J	350	540	<710			<5,000	<5,000	<5,000
Selenium	1.2	7.8-5.4	<7.8-<170	<7.8-<54	<51	<54	<7.8	<14			<100	<100	<100

☐ CT&E Data.
N/A Not available.
J Result is an estimate.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)

Matrix: Soil/Sediment
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Bkgd. Range from 7 DEW Line Installations	Wainwright Bkgd. Range	Environmental Samples						Field Blanks		Lab Blanks
					S01-0.5	SD01-0.5	2S02-1	2SD02-1			EB01	2EB03	
Laboratory Sample ID Numbers					4479-6	4479-5	4694-4	4694-1			4479-7	4695-3	4479 4695 4694
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			µg/L	µg/L	µg/L
Silver	0.53	3.9-71	<3-<110	<3.9-<71J	<26R	<27	<3.9	<71J			<50R	<50	<50
Sodium	0.55	5	<160-680	41-140	58	41	47	140			410	370	<250
Thallium	0.011	0.25-0.76	<0.2-<1.2	<0.25-<0.76	<0.25	<0.27	<0.38	<0.76			<5	<5	<5
Vanadium	0.036	1	6.3-59	9.5-16	14	9.5	16	9.9			<50	<50	<50
Zinc	0.16	1	9.2-95	9.2-16	13	9.2	14	16			<50	<50	<50

☐ CT&E Data.
J Result is an estimate.
R Result has been rejected.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)
Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range	Environmental Samples		Field Blanks				Lab Blanks
					SW01	2SW02	AB01	EB01	TB01	2EB03	
Laboratory Sample ID Numbers					1284/1286 4480-3	1869/1870 1904 4694-8	1424	1280/1282 4479-7	1260 4479-8	1876/1896 4695-3	#6-9993 #5-9193 #1&2-9793 #1&2-9293 4694/4695 4479/4480
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DRPH	100	1,000		<1,000J[b]	<1,000[b]	<1,000J[b]	NA	<1,000[b]	NA	<1,000J[b]	<1,000J
GRPH	5-10	50-100		<50J[b]-<100J[b]	<100J[b]	<50J[b]	<50J[b]	<100J[b]	<100J[b]	<50J[b]	<50J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000	NA	<2,000	NA	<2,000	<2,000
BTEX (8020/8020 Mod.)											
Benzene	0.1	1	5	<1	<1	<1	<1	<1	<1	<1	<1-<5
Toluene	0.1	1	1,000	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	0.1	1	700	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes (Total)	0.2	2	10,000	<2	<2	<2	<2	<2	<2	<2	<2
HVOC 8010	0.5-1	5-10		<5-<10	<10	<5	<1	<10	<10	<5	<1-<10J
VOC 8260	1	1		<1	<1	<1	NA	<1	<1	<1-4.1	<1
SVOC 8270	10	10-13		<10-<13	<10	<13	NA	<10	NA	<21	<10
Pesticides	0.02-2.5	0.2-25		<0.2J-<25J	<0.2J-10J	<0.2J-<25J	NA	<0.2J-<10J	NA	<0.2J-<25J	<0.01J-<0.5J
PCBs	0.2	2	0.5	<2J	<2J	<2J	NA	<2J	NA	<2J	<2J

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)

Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range	Environmental Samples		Field Blanks				Lab Blanks
					SW01	2SW02	AB01	EB01	TB01	2EB03	
Laboratory Sample ID Numbers					1284/1286 4480-3	1869/1870 1904 4694-8	1424	1280/1282 4479-7	1260 4479-8	1876/1896 4695-3	4694/4695 4479/4480
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
TOC	5,000	5,000		7,480	7,480	NA	NA	<5,000	NA	<5,000	<5,000
TSS	100	200		7,000-35,000	35,000	7,000	NA	NA	NA	NA	<200
TDS	10,000	10,000		91,000-151,000	91,000	151,000	NA	NA	NA	NA	<10,000

☐ CT&E Data.
NA Not analyzed.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)

Matrix: Surface Water
Units: µg/L

METALS ANALYSES: TOTAL (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Wainwright Bkgd. Levels	Environmental Samples				Field Blanks		Lab Blanks
						SW01	2SW02			EB01	2EB03	
Laboratory Sample ID Numbers						4480-3	4694-8			4479-7	4695-3	4694/4695 4479/4480
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			µg/L	µg/L	µg/L
Aluminum	17.4	100		<100-350 (<100-340)	120-130 (<100)	120 (<100)	130 (<100)			<100	<100	<100
Antimony	N/A	100	6	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)			<100	<100	<100
Arsenic	5.3	100	50	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)			<100	<100	<100
Barium	1.2	50	2,000	<50-93 (<50-91)	<50-52 (<50)	52 (<50)	<50 (<50)			<50	<50	<50
Beryllium	N/A	50	4	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Cadmium	1.7	50	5	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Calcium	34.5	200		4,500-88,000 (4,100-86,000)	4,500-8,200 (4,100-8,200)	8,200 (8,200)	4,500 (4,100)			410	<200	<200
Chromium	3.29	50	100	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Cobalt	N/A	100		<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)			<100	<100	<100
Copper	2.3	50	1,300	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Iron	25	100		180-2,800 (<100-1,600)	900-1,200 (190-630)	900 (190)	1,200 (630)			<100	<100	<100
Lead	6.6	100	15	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)			<100	<100	<100

☐ CT&E Data.
N/A Not available.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Background (BKGD)

Matrix: Surface Water
Units: µg/L

METALS ANALYSES: TOTAL
(DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Wainwright Bkgd. Levels	Environmental Samples				Field Blanks		Lab Blanks
						SW01	2SW02			EB01	2EB03	
Laboratory Sample ID Numbers						4480-3	4694-8			4479-7	4695-3	4694/4695 4479/4480
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			µg/L	µg/L	µg/L
Magnesium	47.8	200		<5,000-53,000 (2,600-54,000)	2,900-3,500 (2,600-3,400)	3,500 (3,400)	2,900 (2,600)			<200	<200	<200
Manganese	1.24	50		<50-510 (<50-120)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Molybdenum	N/A	50		<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Nickel	5.5	50	100	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Potassium	1,154	5,000		<5,000 (<5,000)	<5,000 (<5,000)	<5,000 (<5,000)	<5,000 (<5,000)			<5,000	<5,000	<5,000
Selenium	62.4	100	50	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)			<100	<100	<100
Silver	2.6	50	50	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50R	<50	<50
Sodium	27.7	250		8,400-410,000 (8,200-450,000)	8,400-9,900 (8,200-10,000)	9,900 (10,000)	8,400 (8,200)			410	370	<250
Thallium	0.57	5	2	<5 (<5)	<5 (<5)	<5 (<5)	<5 (<5)			<5	<5	<5
Vanadium	1.8	50		<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50
Zinc	8.2	50		<50-160 (<50)	<50 (<50)	<50 (<50)	<50 (<50)			<50	<50	<50

☐ CT&E Data.
N/A Not available.
R Result has been rejected.

TABLE 2-4. ANALYTICAL METHODS AND TOTAL NUMBER OF SOIL/SEDIMENT ANALYSES

SOIL/SEDIMENT ANALYSES	ANALYTICAL METHOD	REPORTING UNITS	NUMBER OF ANALYSES	REPLICATES	TOTAL ANALYSES
Volatile Organics	SW5030/8260	mg/kg	17	2	19
Semi-Volatile Organics	SW3550/8270	mg/kg	10	1	11
Total Metals Analysis --ICP Screen	SW3050/6010	mg/kg	14	1	15
TOC, Soil	SW9060	mg/kg	8	0	8
TPH[a] - Diesel Range	SW3510/3550/8100M	mg/kg	51	5	56
TPH - Gasoline Range	SW5030/8015M	mg/kg	47	4	51
TPH - Residual Oil	SW3510/3550/8100M	mg/kg	49	5	54
BTEX	SW5030/8020/8020M	mg/kg	45	4	49
Halogenated Volatile Organic Compounds	SW5030/8010M	mg/kg	32	3	35
PCB	SW5030/8080/8080M	mg/kg	33	4	37
Pesticides	SW5030/8080/8080M	mg/kg	10	0	10
TOTAL SOIL ANALYSES			316	29	345
TOTAL SOIL SAMPLES			49	5	54

a TPH = Total Petroleum Hydrocarbons.
M Modified.
N/A Not applicable.

TABLE 2-5. ANALYTICAL METHODS AND TOTAL NUMBER OF WATER ANALYSES

WATER ANALYSES	ANALYTICAL METHOD	REPORTING UNITS	NUMBER OF ANALYSES	TRIP BLANKS	AMBIENT CONDITION BLANKS	EQUIPMENT BLANKS	DUPLICATES	TOTAL ANALYSES
Volatile Organics	SW5030/8260	µg/L	10	0	0	2	1	13
Semi-Volatile Organics	SW3550/8270	µg/L	10	0	0	2	1	13
Total Metals Analysis --ICP Screen	SW3005/6010	µg/L	8	0	0	3	0	11
Dissolved Metals Analysis --ICP Screen	SW3005/6010	µg/L	8	0	0	0	0	8
TOC, Nonpurgable	SW9060	µg/L	6	0	0	3	1	10
Residue, Filterable (TSS)	E 160.2	µg/L	8	0	0	0	1	9
Residue, Filterable (TDS)	E 160.1	µg/L	8	0	0	0	1	9
TPH[a] - Diesel Range	SW3510/3550/8100M	µg/L	17	0	0	3	3	23
TPH - Gasoline Range	SW5030/8015M	µg/L	15	3	1	3	2	24
TPH - Residual Oil	SW3510/3550/8100M	µg/L	17	0	0	3	3	23
BTEX	SW5030/8020/8020M	µg/L	15	3	1	3	2	24
Halogenated Volatile Organic Compounds	SW5030/8010M	µg/L	6	3	1	3	0	13
PCB	SW5030/8080/8080M	µg/L	6	0	0	3	0	9
Pesticides	SW5030/8080/8080M	µg/L	6	0	0	3	0	9
TOTAL WATER ANALYSES			140	9	3	31	15	198
TOTAL WATER SAMPLES			17	3	1	3	3	27

[a] TPH = Total Petroleum Hydrocarbons.

The fixed laboratory in Anchorage, Alaska, was operated by CT&E. CT&E analyzed samples for the following constituents:

Analyses	Analytical Method
Volatile Organic Compounds (VOCs)	SW5030/8260
Metals	SW3050 (Soil) 3005 (Water)/6010
Semi-Volatile Organic Compounds (SVOCs)	SW3550 (Soil) 3510 (Water)/8270
Total Dissolved Solids (TDS)	E160.1
Total Suspended Solids (TSS)	E160.5
Total Organic Carbon (TOC)	SW9060
Moisture Content	ASTM D 2216
Toxicity Characteristic Leaching Procedure (TCLP)	SW1311

In addition, for the first few weeks of the field activities, CT&E provided the following analyses on a quick-turnaround basis:

Analyses	Analytical Method
Halogenated Volatile Organic Compounds (HVOCs)	SW5030/8010
Benzene, Toluene, Ethylbenzene, and Xylene (BTEX)	SW5030/8020
Gasoline Range Petroleum Hydrocarbons (GRPH)	8015 Modified
Diesel Range Petroleum Hydrocarbons (DRPH)	8100 Modified
Polychlorinated Biphenyls/Pesticides	SW5030/8080

The temporary laboratory in Barrow, Alaska, was operated by F&B of Seattle. F&B analyzed samples for the following constituents:

Analyses	Analytical Method
Halogenated Volatile Organic Compounds (Four compounds only)	SW5030/8010 Modified
Benzene, Toluene, Ethylbenzene, and Xylene	SW5030/8020 Modified
Polychlorinated Biphenyls/Pesticides	SW3550/8080 Modified
Diesel Range Organics (DRO)	8100 Modified
Gasoline Range Organics (GRO)	8010/8020/8015 Modified
Residual Range Organics	8100 Modified

Analytical methods used during sample analyses for this project are summarized in Tables 2-4 and 2-5 and are developed from the reference methods described in the following sources:

- *Test Methods for Evaluating Solid Waste (Physical/Chemical Methods)* Third Edition, EPA SW-846. September 1986.

- *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020. March 1983.

- *Standard Methods for the Examination of Water and Wastewater*, APHA/AWWA, 17th Edition. 1989.

- *Interim Guidance for Non-UST Soil Cleanup Levels*, Alaska Department of Environmental Conservation. July 1991.

Project-specific analytical methods and procedures, target analytes, quantitation limits, and acceptance criteria are presented in the RI/FS SAP (U.S. Air Force 1993b).

2.3.4 Chronology of Laboratory Analyses

Laboratory analyses conducted by the temporary laboratory, F&B, in Barrow, Alaska, were conducted on a quick-turnaround basis. The samples collected at Wainwright radar installation were analyzed by this laboratory during the period from 31 August to 10 September 1993.

Analyses at the CT&E laboratory in Anchorage, Alaska, were conducted between 1 September and 22 October 1993. These analyses included a few quick-turnaround analyses but primarily standard-turnaround analyses.

2.3.5 Laboratory QA/QC Programs

The QA objectives for this project were achieved through implementation of specific procedures for sampling, chain-of-custody, calibration, laboratory analyses, data validation and reporting, internal QC, audits, preventive maintenance, and corrective actions.

A detailed description of QA/QC measures, frequency, and corrective actions used by both labs is presented in the Quality Assurance Project Plan (QAPjP) (Section 1.0 of the RI/FS SAP [U.S. Air Force 1993b]). Ultimately, the relevant laboratory standard operating procedures (SOPs) provide full and detailed guidance regarding all method-specific laboratory QA/QC criteria and appropriate corrective actions.

Data quality for the organic analyses was monitored by the laboratory through a QA program that included analyses of initial and continuing calibrations, method blanks, surrogate spikes, internal standards, matrix spikes and matrix spike duplicates, and laboratory control samples. The identification of target analytes at levels above the detection limit was confirmed by gas chromatography/mass spectrometry (GC/MS) or analysis on a GC equipped with a different column (second column confirmation).

Data quality for the inorganic analyses was monitored through a QC program that included analyses of initial and continuing calibrations, laboratory control samples, method blanks, duplicate samples, post-digestion analytical spikes, and matrix spikes.

Laboratory QC samples were analyzed at a rate of at least one per 20 determinations. See the RI/FS QAPjP for laboratory-specific criteria for the frequency of QC sample analyses and corrective actions regarding QC analyses.

2.3.6 Data Validation and Reporting

Data validation is a systematic process of reviewing a group of sample data to provide assurance that the data are adequate for their intended use. The validation activities were performed in accordance with the following EPA documents to the extent that they were applicable:

- *Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses*. EPA. Hazardous Site Evaluation Division. December 1990.

- *Laboratory Data Validation Guidelines for Evaluating Inorganic Analyses*. EPA. Hazardous Site Evaluation Division. October 1989a.

- *Test Methods for Evaluating Solid Waste (Physical/Chemical Methods)* Third Edition, EPA SW-846. September 1986.

Prior to releasing data for use by project staff, selected data packages underwent a formal validation procedure to examine laboratory compliance with QA requirements and other factors that determine the quality of the data. The organic validation was performed by the prime contractor in accordance with the EPA Functional Guidelines for Evaluating Organic Analyses. The following factors were examined:

- Sample holding times;
- Sample chain-of-custody;
- GC/MS tuning criteria;
- Initial and continuing calibration;
- Method blanks;
- Practical quantitation limits;
- Laboratory blank contamination;
- Surrogate spike recoveries;
- Matrix spike/duplicate analysis;
- Field duplicate analysis;
- Ambient condition blank contamination;
- Trip blank contamination;
- Internal standard area;
- Pesticide instrument performance;
- Compound identification criteria; and
- Analyte identification and quantitation.

The inorganic data validation was performed in accordance with the EPA Functional Guidelines for Evaluating Inorganic Analyses. Parameters evaluated include:

- Holding time;
- Blank results;
- Instrument calibration;
- Inductively Coupled Plasma (ICP) Spectroscopy interference check analysis;
- Laboratory Control Samples;

- Duplicate analysis;
- Spike analyses;
- Furnace analyses (spikes and duplicates);
- Serial dilution;
- Detection limits; and
- Analyte quantitation.

When a data package was received from the laboratory, the analytical results and associated QA/QC documentation were reviewed for technical compliance, and data validation reports were prepared summarizing the QA/QC parameters. Along with a report of all laboratory and field blank sample data, the data were reviewed for accuracy, precision, and completeness.

A cross-section of CT&E analytical data, representing approximately 15 percent of all the CT&E analyses, underwent formal data validation. Because some reporting errors were found in the F&B analytical data, 100 percent of the F&B data was validated. Once the validation for a batch of samples was completed, a validation report was prepared. The report highlights all the QC criteria evaluated, and notes any major deficiencies or QA problems. Although a minimal amount of analytical data was rejected during data evaluation, the acceptable and valid data from CT&E and F&B are sufficient to meet the project objectives. The data validation reports for data generated by CT&E and F&B are presented in Appendix G.

2.4 METHODOLOGY FOR RISK ESTIMATION

This section describes the methods used to determine the potential risks to human and ecological receptors from chemicals detected in samples collected from the six sites at the installation. A summary of the risks posed by chemicals detected at each of the sites is presented on a site-by-site basis in Sections 3.0 and 4.0. The complete human health and ecological risk assessments are presented in the Wainwright Risk Assessment (U.S. Air Force 1996), which has been submitted under separate cover.

In addition to the methods for risk evaluation, this section presents contaminant fate and transport, general potential migration pathways, and receptor groups common to all of the six Wainwright sites.

2.4.1 Human Health Risk

The evaluation of human health risk was conducted in accordance with standard risk assessment methodology as described in *Risk Assessment Guidance for Superfund (RAGS): Human Health Evaluation Manual, Part A* (EPA 1989b), *Region 10 Supplemental Risk Assessment Guidance for Superfund* (EPA 1991a), and the *Handbook to Support the Installation Restoration Program Statements of Work* (U.S. Air Force 1991). This section presents a summary of the approach used in evaluating the human health risks associated with the sites at the Wainwright radar installation.

The Wainwright DEW Line installation presented a unique challenge to the development of a human health risk assessment. Many of the conventional assumptions applied to risk assessments do not apply to the North Slope of Alaska. Wainwright is remote and sparsely populated. Native residents, largely Inupiats, follow a lifestyle that includes a significant subsistence component; much of their food consists of mammals (whales and caribou), aquatic life (Arctic char), and birds (ptarmigan and duck) that are abundant in this area of the arctic. The climate is generally harsh, and the soil and surface water are frozen for approximately nine months of the year. The following paragraphs present some of the approaches and assumptions used in the development of the human health risk assessment.

The general approach to the human health risk assessment was to quantify the excess lifetime cancer risk and the noncancer hazard associated with exposure to the site contaminants detected at each of the six sites at the installation. The maximum concentration of each chemical detected is used at the exposure point concentration instead of an arithmetic mean of 95 percent percentile upper confidence limit (UCL) because contamination was infrequently detected and found to be generally of low concentration. Incorporating nondetects into the calculation of an average of UCL when the frequency of positive detects is low tends to yield low and unreliable estimates of contamination. Use of the maximum concentration yields a more conservative estimate of risk or hazard.

Chemical concentrations detected in soil/sediment and surface water samples from each of the sites were compared to risk-based screening levels (RBSLs), ARARS, and background concentrations. A chemical was selected as a COC if the maximum concentration at which the chemical was detected exceeded the corresponding background concentration, and the RBSL (based either on cancer risk or noncancer hazard) or an ARAR. In addition, chemicals detected above background levels were retained as COCs if no RBSL or ARAR was available. COCs selected in this manner were evaluated in the human health risk assessment.

An exposure pathway describes the course a chemical will take from a source to an exposure point where a receptor can come into contact with the chemical. The exposure pathways by which exposure to COCs at Wainwright may occur include ingestion, dermal contact, and inhalation. The dermal contact and inhalation pathways were not considered complete or significant because the arctic climate precludes dermal contact with and volatilization of site contaminants, so they were not evaluated. Exposure pathways that were considered for all sites were incidental ingestion of soil/sediment and ingestion of surface water.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of a community in the North Slope of Alaska (native), and a child living in a North Slope community (child).

The risk assessment assumed a residential scenario when estimating the soil/sediment and water ingestion rates. The soil/sediment ingestion rate was based on EPA default values, 100 mg/day for adults and 200 mg/day for children. The drinking water ingestion rate assumed that surface water where chemicals were detected at the site will be used as a source of drinking water for 180 days per year at the EPA default ingestion rate of 2 liters per day.

The exposure duration assumed a DEW Line worker would be stationed at the Wainwright installation for 10 years. The exposure duration for the native was estimated at 55 years. EPA's default reasonable maximum exposure duration is 30 years; however, this is based on the residence time in one location for the continental United States. Because Alaskan natives are more likely to remain in North Slope communities for a longer period, 55 years was determined to be a more appropriate estimate of residence time.

The risk assessment was based on the assumptions above, along with chemical-specific toxicity data, to quantitatively and qualitatively express the hazards and risks. To characterize potential noncancerous effects, comparisons were made between projected intakes of substances and chemical-specific toxicity values. The potential noncancerous health effects were expressed as a HQ. To assess the overall potential for noncancerous effects posed by more than one chemical at a site, the hazard quotients were summed and reported as the hazard index. An HQ or hazard index of 1.0 is the regulatory benchmark. Noncancer hazards greater than 1.0 are generally considered a concern, and noncancer hazards of less than 1.0 are generally considered not to warrant further evaluation.

To characterize the potential for carcinogenic effects, the probability that an individual will develop cancer over a lifetime of exposure, the risks were estimated from projected intakes of the COCs and chemical-specific dose-response information. The cancer risks are calculated on a chemical-specific basis and are added together (if more than one chemical associated with cancer risk is a COC at the site) to estimate the total cancer risk for the site. The total cancer risk for each pathway is generally not considered to be of concern unless it exceeds a value of 1×10^{-6}.

Excess lifetime cancer risk is the incremental increase over and above the background (i.e., if no exposure to site chemicals occurs) in the probability of developing cancer during one's lifetime. For example, a 1×10^{-6} excess lifetime cancer risk means that, for every one million people exposed to the carcinogen throughout their lifetimes, the average incidence of cancer may increase by one case of cancer. The background probability among Americans of developing cancer at some time in their lives is about one in four (American Cancer Society 1993). The calculation of cancer risks uses information (i.e., cancer slope factors) developed by the EPA that represents upp[illegible] [illegible]ound estimates, so any cancer risks estimated in the risk assessment should be regarded [illegible] [illegible]per bounds on the potential cancer risks rather than accurate representations of true cance[illegible] [illegible]sk. The true cancer risk is likely to be lower than that predicted (EPA 1989a).

Excess lifetime cancer risk and noncancer hazard were calculated for the soil/sediment ingestion and water ingestion pathways. Other pathways were eliminated from consideration as described in the Wainwright Risk Assessment (U.S. Air Force 1996). The risks and hazards associated with chemicals detected at the Wainwright sites are presented on a site-by-site basis in Sections 3.0 through 5.0 of this RI/FS report.

2.4.2 Ecological Risk

The objective of the ecologial risk assessment (ERA) is to estimate potential impacts to aquatic and terrestrial plants and animals at the Wainwright DEW Line installation. The evaluation of

environmental risks was conducted in accordance with current Air Force and EPA guidance, specifically, *Handbook to Support the Installation Restoration Program Statements of Work* (U.S. Air Force 1991), *Framework for Ecological Risk Assessment* (EPA 1992), and *Ecological Risk Assessment Guidance for Superfund* (EPA 1994).

The approach used to assess potential ecological impacts was conceptually similar to that used to assess human health risks. Potentially exposed populations (receptors) were identified, and information on exposure and toxicity was combined to derive estimates of risk. However, the scope of ERAs is generally different from that of human health risk assessments in that ecological assessment focuses on potential impacts to populations of organisms rather than to individual organisms (except in the case of endangered species where individuals are considered). In addition, because ecosystems are composed of a variety of species, ecological assessments evaluate potential impacts to numerous species instead of a single species (as is the case in human health assessments).

Ideally, ERAs should evaluate potential risks to communities and ecosystems, as well as to individual populations. However, because of the large number of species and communities present in natural systems, such ecosystem-wide assessments are very complex and appropriate assessment methodologies have not yet been developed. In addition, dose-response data on community or ecosystem responses are generally lacking. Therefore, evaluations of potential impacts to communities or ecosystems are qualitative.

The degree to which potential ecological impacts can be characterized is highly dependent upon the data available to support such estimates. Data required include information regarding contaminant release, transport, and fate; characteristics of potential receptor populations; and adequate supporting toxicity data for the COCs. The degree to which the existing database can meet these requirements dictates the extent to which potential ecological impacts can be evaluated.

Ecological receptors can be exposed to COCs through abiotic and biotic media. Potential exposure pathways for terrestrial and aquatic organisms include direct contact and ingestion of contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water, but may be exposed to COCs through ingestion of plant and animal items in the diet, and incidental ingestion of soil/sediment while foraging (although only direct contact with surface water is used to develop risk estimates). Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items, and incidental ingestion of soil/sediment.

The potential ecological receptors evaluated in the risk assessment include plants, aquatic organisms, birds, and mammals likely to occur along the Arctic Coastal Plain. Representative species from these groups of receptors were selected based primarily on the species' likelihood of exposure given their preferred habitat and feeding habits. Species that may be particularly sensitive to environmental impacts, such as endangered or threatened species, were also evaluated. The representative species are presented in Table 2-6. All of these representative species are evaluated at the Wainwright installation with the exception of the Arctic char, which

TABLE 2-6. REPRESENTATIVE SPECIES AT THE WAINWRIGHT INSTALLATION SITES

COMMON NAME	GENUS AND SPECIES
Sedge	*Carex* spp.
Cottongrass	*Eriophorum* spp.
Willow	*Salix* spp.
Berries	*Vaccinium* spp.
Water fleas	*Daphnia* spp.
Nine-spined stickleback	*Pungitius pungitius*
Arctic char	*Salvelinus alpinus*
Lapland longspur	*Calcarius lapponicus*
Brant	*Branta bernicla*
Glaucous gull	*Larus hyperboreus*
Pectoral sandpiper	*Calidris melanotos*
Brown lemming	*Lemmus trimucronatus*
Arctic fox	*Alopex lagopus*
Barren-ground caribou	*Rangifer tarandus*

does not have any suitable habitat at Wainwright. There were no endangered or threatened species identified at the Wainwright installation. Therefore, threatened and endangered species were not evaluated in this ERA.

Potential risks to representative species were estimated by evaluating sampling data for the relevant exposure media (i.e., soil/sediment and surface water). Potential risks to plants were evaluated by comparing the average contaminant concentrations in the site soil/sediment to toxicity information in the literature. Potential impacts on aquatic receptors were evaluated by comparing average surface water concentrations to toxicity reference values (TRVs). Potential impacts to birds and mammals were evaluated for selected representative species by comparisons of estimated exposures, based on potential dietary intakes of COCs, to TRVs. TRVs for representative species are derived by selecting toxicity values from the literature and extrapolating to the species of concern. TRVs are then divided into the estimated exposure concentration to derive the HQ. If the HQ is less than one, then adverse effects are not expected. Conversely, if the HQ is equal to or greater than one a potential for adverse effects exists. The confidence level of the risk estimate is increased as the magnitude of the HQ departs from 1.0. For example, there is greater confidence in a risk estimate where the HQ is 0.1 or 10, than in an HQ such as 0.9 to 1.1.

TRVs are calculated to be protective for long-term exposures. This is accomplished by using chronic chemical and receptor-specific no-effect dosages as starting points when such data is available. If chronic or receptor-specific data is not available, then uncertainty and scaling factors (to account for differences in body size) are incorporated in the derivation of the TRVs. This is standard practice in ERAs and is illustrated in screening level benchmarks used in the ERA for sediments (Hull and Suter 1994), aquatic biota (Suter and Mabrey 1994), and wildlife (Opresko et al. 1994). The assumptions incorporated in the ERA assume daily exposure during the receptor's most sensitive life stage (i.e., one breeding season). Consequently, if no risks are identified at the "chronic" level, there will be no risk related to "acute", or occasional exposures. This should be kept in mind when interpreting the HQ. Although the HQ may be greater than one, the conservatism embodied in the TRV, and assumptions of the ERA, allow for mitigating factors (e.g., large home range, short seasonal exposure, unlikely repeated exposures at a "hot spot" location) that may result in a finding of no significant risk.

The ERA was intended to be at a screening level, rather than a full scale investigation of the state of the ecosystem. No specific onsite studies of the biota were undertaken. The assessment was based on media sampling (i.e., surface water and soil/sediment samples). The ecological risks associated with the chemicals detected at the Wainwright sites are presented site-by-site in Sections 3.0 through 4.0 of this RI/FS report. The complete ERA is presented in the Section 3.0 of the Wainwright Risk Assessment (U.S. Air Force 1996).

2.4.3 Contaminant Fate and Transport

The fate and transport of the COCs in soil/sediment and surface water have been accounted for in the sampling plan. Known source areas were sampled, and the extent of migration was evaluated by sampling at increasing distances from the source area. Surface and subsurface sampling was conducted in gravel pads and tundra areas to characterize the extent of contaminant migration. Ground water was not evaluated because subsurface water flow occurs only in the active layer over the permafrost, and ground water is not used for domestic purposes. Surface water samples were collected in streams and ponds and analyzed to evaluate the migration of contamination from source areas to water bodies potentially used by human or ecological receptors. The potential for contaminant migration is discussed on a site-specific basis in Sections 3.0 and 4.0.

2.4.4 General Migration Pathways

This section presents general information concerning migration pathways for the six sites at the Wainwright radar installation. Site-specific migration pathways are presented in Sections 3.0 and 4.0.

The potential for contaminant migration exists for any site where a release has occurred. The threat that a contaminated site presents to human health or the environment was assessed according to the potential for contaminant migration, human or ecological receptors, and contaminant concentrations to which the receptors may be exposed.

There are three main pathways through which contaminants may reach human and ecological receptors. These pathways are subsurface migration (in affected active layer water), surface migration, and air transportation (as vapors or dust). Potential migration pathways are depicted in Figure 2-3. Figures 2-4 and 2-5 present the potential exposure pathways for the human and ecological receptors, respectively. The discussion of migration pathways is preceded by a general description of the topography and stratigraphy at Wainwright.

2.4.4.1 Topography. The Wainwright installation is located on the northeast shore of Wainwright Inlet, near the Kuk River. The installation is situated approximately four miles southwest of the village of Wainwright, which is located on the Chukchi Sea coast. Although the Wainwright Military Reservation encompasses over two square miles of terrain, most installation facilities are clustered approximately one half mile upgradient from Wainwright Inlet.

The topographic high at the installation is 88 feet above MSL, and the topographic low is Wainwright Inlet (at sea level). The distance between these points is approximately one mile, resulting in a terrain that is relatively flat. Drainage at the site is more prominent adjacent to the inlet; the terrain becomes increasingly marshy further away. Gravel pads and roads rise approximately four to five feet above the tundra. The edges of these features are sloped at the angle of repose for unconsolidated sands and gravels.

The most prominent topographic features, visible from the air and ground surface, are ice wedge polygons. These features are formed by cracking of the ground surface during thermal contraction followed by the infiltration of water. The water then freezes and forces the crack wider. Repeated freeze-thaw cycles enlarge these features, which form small troughs that may fill with water. Intersecting troughs form polygonal arrangements, which range from a couple of feet to tens of feet across.

Two types of ice wedge polygons exist: low centered and high centered. In low centered polygons, the middle of the polygon is depressed to form a small basin, which may fill with water. A cross-section of one of these basins would reveal an ice-wedge trough on either side of the polygon, berms lining both sides of the troughs, and a basin filling the interior space between the berms. A high centered polygon does not have a depressed center, and consists of intersecting troughs with higher ground in the middle.

Another prominent tundra feature consists of oriented lakes. These lakes, which form from low centered polygons, are enlarged by the erosional action of wind-induced waves. These lakes are generally not circular but oblong, with the long axis of the lake normal to the prevailing wind direction. They can "migrate" across the tundra at an average rate of three feet per year (Livingstone 1954), and have a stable depth of approximately 10 feet (Hussey and Michaelson 1966).

2.4.4.2 Stratigraphy. The stratigraphy at Wainwright was examined during RI activities down to the level of the permafrost (generally no deeper than two to four feet). The uppermost features at the site are gravel pads and roads of human origin. These features, which are limited

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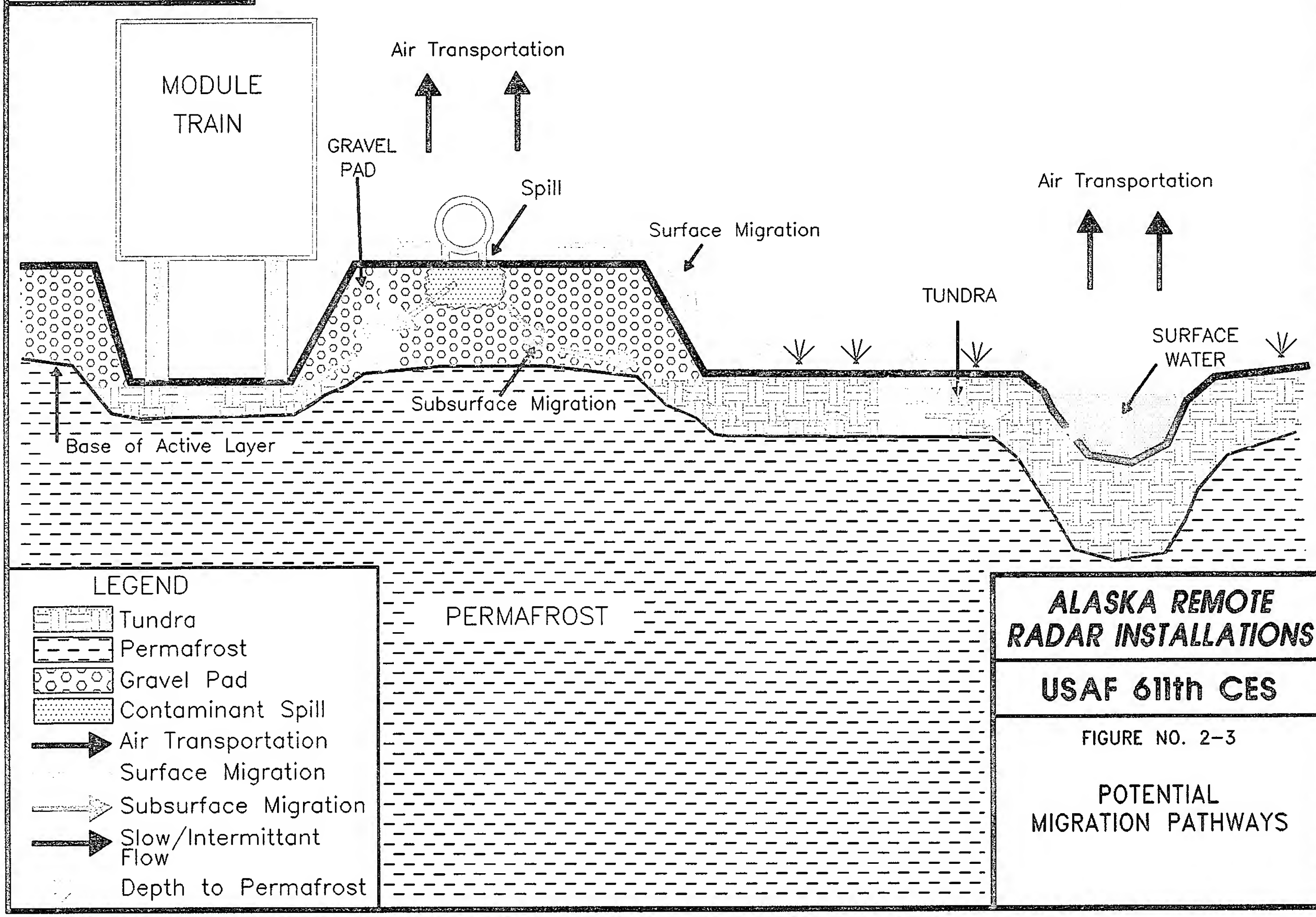

ALASKA REMOTE RADAR INSTALLATIONS

USAF 611th CES

FIGURE NO. 2-3

POTENTIAL MIGRATION PATHWAYS

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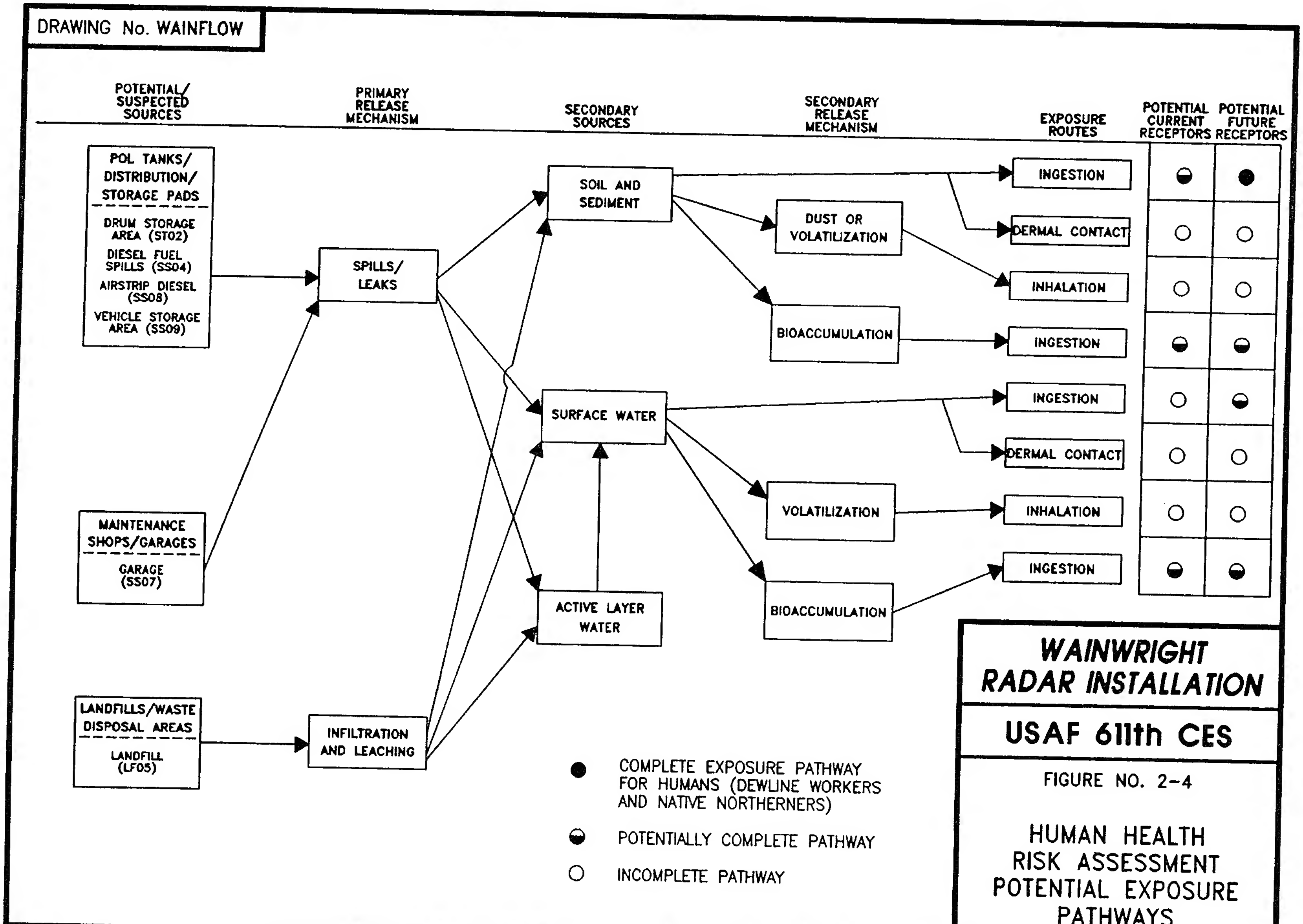

WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 2-4

HUMAN HEALTH RISK ASSESSMENT POTENTIAL EXPOSURE PATHWAYS

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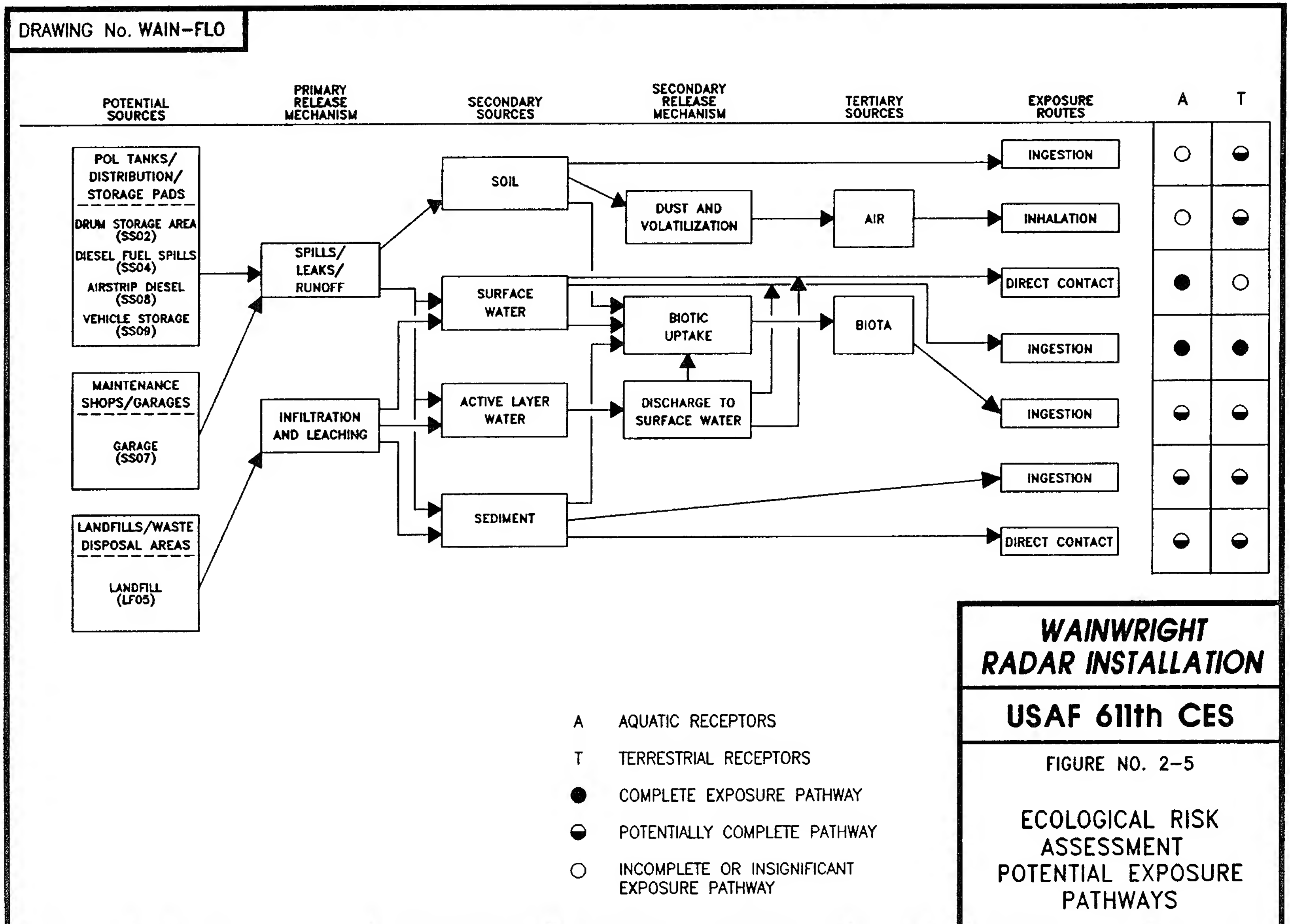

WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 2-5

ECOLOGICAL RISK ASSESSMENT
POTENTIAL EXPOSURE PATHWAYS

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in areal extent, have a maximum height of approximately six feet. They generally consit of well-graded sandy gravels with sub-angular to sub-rounded, very fine to coarse sands and sub-angular to sub-rounded gravel clasts ranging from one-quarter inch to one and one-half inches (although gravel clasts ranging up to four inches or more are occasionally encountered). The grains are unconsolidated, and fine material (silts or clays) may be present in minor quantities. The depth to permafrost under the surfaces of gravel pads and roads ranged from two to four feet during August and September 1993.

Gravel pads and roads were constructed on top of native tundra, which occurs throughout the site. The top several inches of the tundra consists of a vegetative mat in a loamy/silty matrix. Underlying the tundra mat are fine to coarse sands and gravels, dark brown organic clays, and silt layers. The depth to permafrost beneath the tundra was approximately two feet during August and September 1993. Adjacent to Wainwright Inlet, beaches that consist of poor to well sorted, sub-rounded to rounded, fine to coarse sands, sub-rounded to rounded gravel clasts (of varying size), and minor amounts of fine material may be present.

2.4.4.3 Subsurface Migration. Active layer water flow under the tundra is hampered by the presence of numerous wet depressions and the relatively flat topography; because the depth to permafrost under these depressions is increased, they tend to act as small catchment basins. These basins limit the potential for the horizontal flow of active layer water (Miller et al. 1980; Robertson 1988). The active layer water flow in these areas is so inhibited that it contributes little to the midsummer water budget of tundra streams. Most of the active layer water contribution to these streams is from immediately adjacent well drained slopes (Robertson 1988).

Some generalizations about active layer water flow can be made. Due to the combined effects of low topographic relief and the presence of numerous catchment basins, active layer water migration through areas of tundra is a slow process. The active layer water contribution to tundra streams is mainly from well-drained slopes next to those streams. The active layer water flow that does occur is governed by changes in topographic relief and is limited to spring and summer months, with the active layer functioning as a shallow, unconfined aquifer. The water table in such an aquifer tends to mimic topographic features, and active layer water flow is driven by elevation changes. Figure 2-6 illustrates how the elevation changes of gravel roads and berms can restrict active layer water flow.

2.4.4.4 Surface Migration. Surface water migrates from topographic highs to topographic lows; however, the relatively flat topography at the installation creates sluggish surface migration. Surface water flow during the spring thaw, when mounds of snow can channel drainage in unexpected directions, can be markedly different from flow during the summer months. The general surface migration features and directions are depicted in Figure 1-8.

The main factors controlling surface water flow are the topography and water availability. The topography at the Wainwright station has relatively little relief; therefore, there is only a small gradient to drive surface water flow. Combined with the depressions formed by the ice wedge polygons, this creates a multibasinal drainage pattern in which much of the surface water is directed into depressions and small tundra ponds, rather than draining directly into drainage channels.

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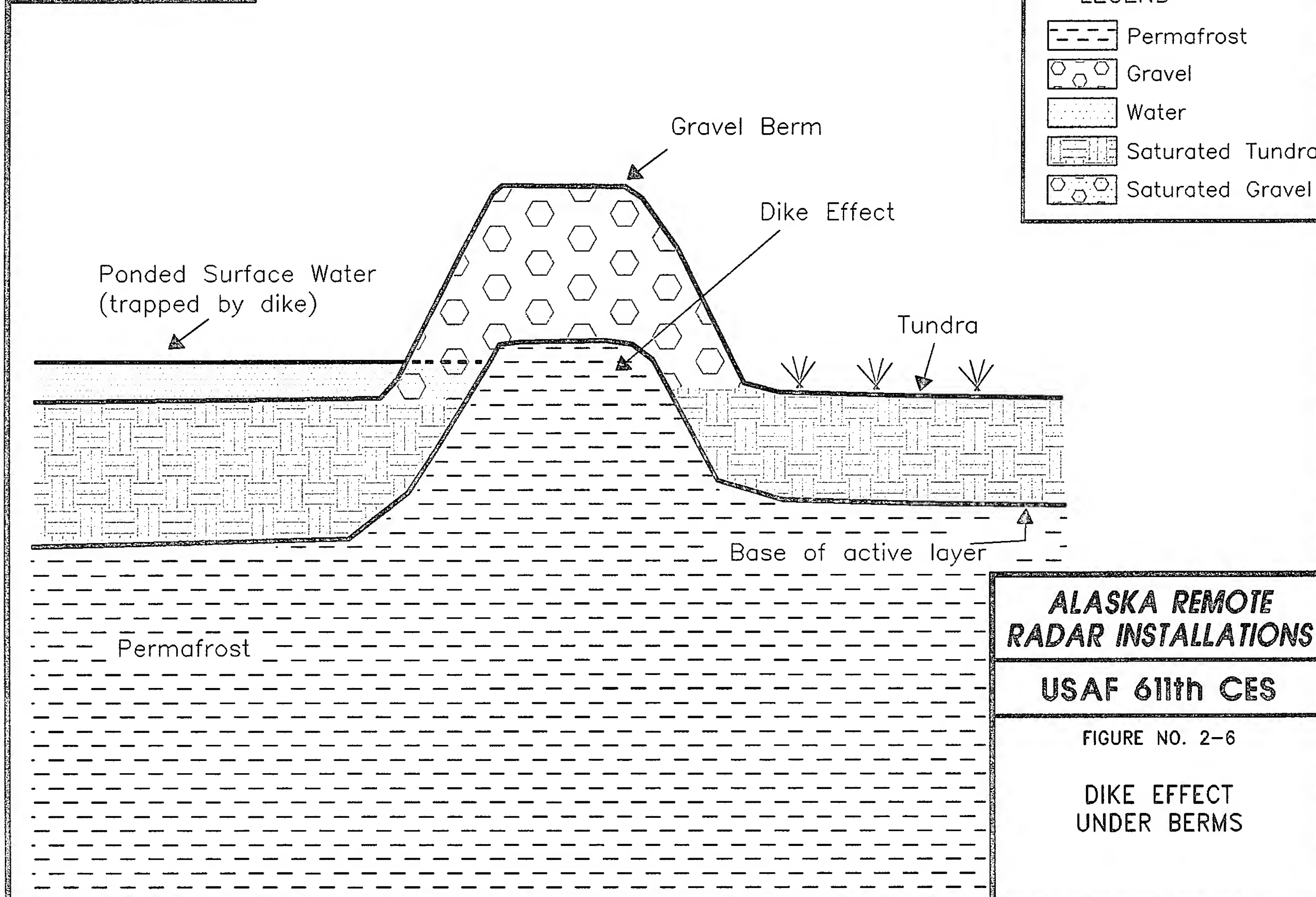

ALASKA REMOTE RADAR INSTALLATIONS

USAF 611th CES

FIGURE NO. 2-6

DIKE EFFECT UNDER BERMS

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Based upon precipitation alone, Wainwright could classify as a desert (Robertson 1988). Precipitation along the Beaufort Sea coast averages only seven inches per year (Dingman et al. 1980; Walker et al. 1980). Additionally, 65 percent of the precipitation on the North Slope is in the form of snow (Walker et al. 1980). Most surface water flow occurs during the spring, when melting snow and ice release stored water over a relatively short time-frame and the active layer remains partially frozen. This creates a situation in which there is a large supply of surface water and very little capacity for infiltration. The result is the overland sheet flow of surface water (Robertson 1988), during which drainage is not confined to local drainage features but may travel in a sheet-like fashion over the topography. Snow, ice, and man-made features (gravel pads and roads) may also result in barriers that force the flow of surface water in directions different from those dictated by the underlying ground surface.

There is comparatively little flow of surface water during the summer. In fact, arctic wetlands exist because the lack of significant vertical relief retards the horizontal flow of surface water, and permafrost limits downward flow (Robertson 1988). Overflow from tundra ponds is generally dependant upon summer rainfall. The potential for contaminant migration in surface water is therefore greatest during the spring thaw, which is of relatively short duration, and during which the precise direction of flow may be difficult to determine.

Few streams cross the installation and enter Wainwright Inlet. Most streams originating in the vicinity of the installation infiltrate into the active layer and disappear after a few hundred feet. Although several small streams enter Wainwright Inlet west of the station, the headwaters of these streams are downgradient of the station. Only one marshy and indistinct stream was observed to pass through the installation and enter Wainwright Inlet. This stream originates at a lake east of the station and passes along the south side of the installation before entering a lake adjacent to the inlet.

2.4.4.5 Air Transport. Air transportation of contaminants is not considered to be a significant migration pathway at Wainwright. The frozen conditions encountered most of the year are not conducive to the volatilization of organic contaminants or to the transport of affected dust and dirt. During the summer months the air and ground temperatures remain relatively low (reducing volatility) and the abundant supply of moisture retards the entrainment of affected dust.

2.4.5 Receptors

Three potential human receptor groups were evaluated for the Wainwright Risk Assessment: an adult assigned to a DEW Line installation (worker), an adult native of the North Slope of Alaska (native), and a native child (child). The first two receptor groups represent the reasonable maximum exposure at an installation that is not in close proximity to a native village. Because the radar installation is close to a village, a child was considered as a potentially exposed individual.

The primary routes of human exposure evaluated in the Wainwright Risk Assessment are incidental ingestion of soil and ingestion of surface water.

For the ecological evaluation it was assumed that terrestrial and aquatic species are potential receptors for at least the six months of the year when the region is not ice and snow covered. In addition, it was assumed that species at great distances from the specific installations are not receptors (e.g., whales). Whales may migrate off-shore from the DEW Line sites; it is unlikely, however, that these mammals are potential receptors to COCs released from the sites because of dilution of surface water entering the Arctic Ocean and the distance off-shore that these animals migrate. Potential ecological receptors evaluated in the ERA were discussed in Section 2.4.2.

The potential human health and ecological risks to receptors associated with the contaminants detected at the Wainwright sites are reported on a site-specific basis in Sections 3.0 and 4.0.

3.0 REMEDIAL INVESTIGATION - NO FURTHER ACTION SITES

This section of the RI/FS presents results from RI sampling and analysis activities for each of the four Wainwright sites recommended for no further action. The four sites considered for no further action and discussed in this section are the Drum Storage Area (ST02), Landfill (LF05), Airstrip Diesel (SS08), and Vehicle Storage Area (SS09). Each of the no further action sites is presented individually in Sections 3.1 through 3.4. (Note: figures and tables are presented at the end of each section.) The information presented for each site includes site background, field sampling and analytical results, potential migration pathways, human health and ecological risk assessment summaries, and conclusions and recommendations. The site-by-site discussions in this section are intended to provide the reader with all site information needed to support no further action for these sites.

Photographs of the Wainwright installation and the sites investigated during the RI are presented in Appendix B. Data tables in this section list analytical results from samples in which chemicals were detected above quantitation limits. Complete laboratory analytical data sheets for each sample, including quantitation limits for non-detected analytes, are provided in Appendix F.

3.1 DRUM STORAGE AREA (ST02)

3.1.1 Site Background

The Drum Storage Area (ST02) site is a gravel pad located southwest of the main station adjacent to the lagoon at the end of the access road. Approximately fifteen 55-gallon drums are present at the site. Most of the drums at the site are empty; others contain rainwater. A platform support structure exists at the south end of the site, and solidified bags of concrete and wood debris remain along the beach and at the north end of the site. The site was used for temporary storage of drummed products. Campfire ashes located in the middle of the gravel pad indicate the site may have been used by the residents of Wainwright.

3.1.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Drum Storage Area (ST02) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

3.1.2.1 Summary of Samples Collected. A total of five soil samples was collected from the gravel pad at the site. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Drum Storage Area (ST02) are presented in Figure 3-1.

The five soil samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOCs, and PCBs. In addition, two samples were analyzed for VOCs, SVOCs, and total metals.

3.1.2.2 Analytical Results. The data summary table (Table 3-1) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds and inorganic analytes with samples collected from the site. Sample locations and analytical results for the samples are illustrated in Figure 3-1. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. In addition, metals detected above background levels that exceed an RBSL or ARAR are presented on Figure 3-1. The exceptions are presented on the data summary table.

Following are discussions of organic compounds and inorganic analytes detected above background levels at the site.

Organics. One SVOC was detected in two soil samples at similar concentrations to the background samples. Di-n-butylphthalate was detected at concentrations ranging from 1.60 to 8.08 mg/kg in the environmental samples, 1.69 to 83.4 mg/kg in the background samples, and in the laboratory blank at a concentration of 1.41 mg/kg. Di-n-butylphalate, a common laboratory contaminant, was detected in the laboratory blank associated with the affected samples and probably represents cross-contamination at the laboratory during analysis. No other organic compound was detected at the site.

Inorganics. Metals analyses indicated that four metals (cobalt, iron, manganese, and sodium) were detected at concentrations above background levels in soil sample ST02-S04.

3.1.2.3 Summary of Site Contamination. No contaminants were detected at levels of concern, and no previous sampling has been conducted at the site. Some metals (inorganics) were detected above background in soil; however, none exceed an RBSL or ARAR or are considered to be a COC in the human health risk assessment. The one organic compound detected at low levels is a common laboratory contaminant; however, it was detected well below both the associated RBSL and ARAR. Although there was a potential risk identified to ecological receptors due to iron in soil, there are several mitigating factors that result in a low risk estimate to ecological receptors from iron at the Drum Storage Area (U.S. Air Force 1996).

3.1.3 Conclusions and Recommendations

Sampling and analyses have determined that the Drum Storage Area (ST02) is not contaminated. No contaminant was detected at a level of concern in site samples, so there appears to be little to no potential for contaminant migration or risks posed by the site to human health or ecological receptors.

Based on the RI sampling and analyses and the risk assessment, the Drum Storage Area (ST02) site is recommended for no further action.

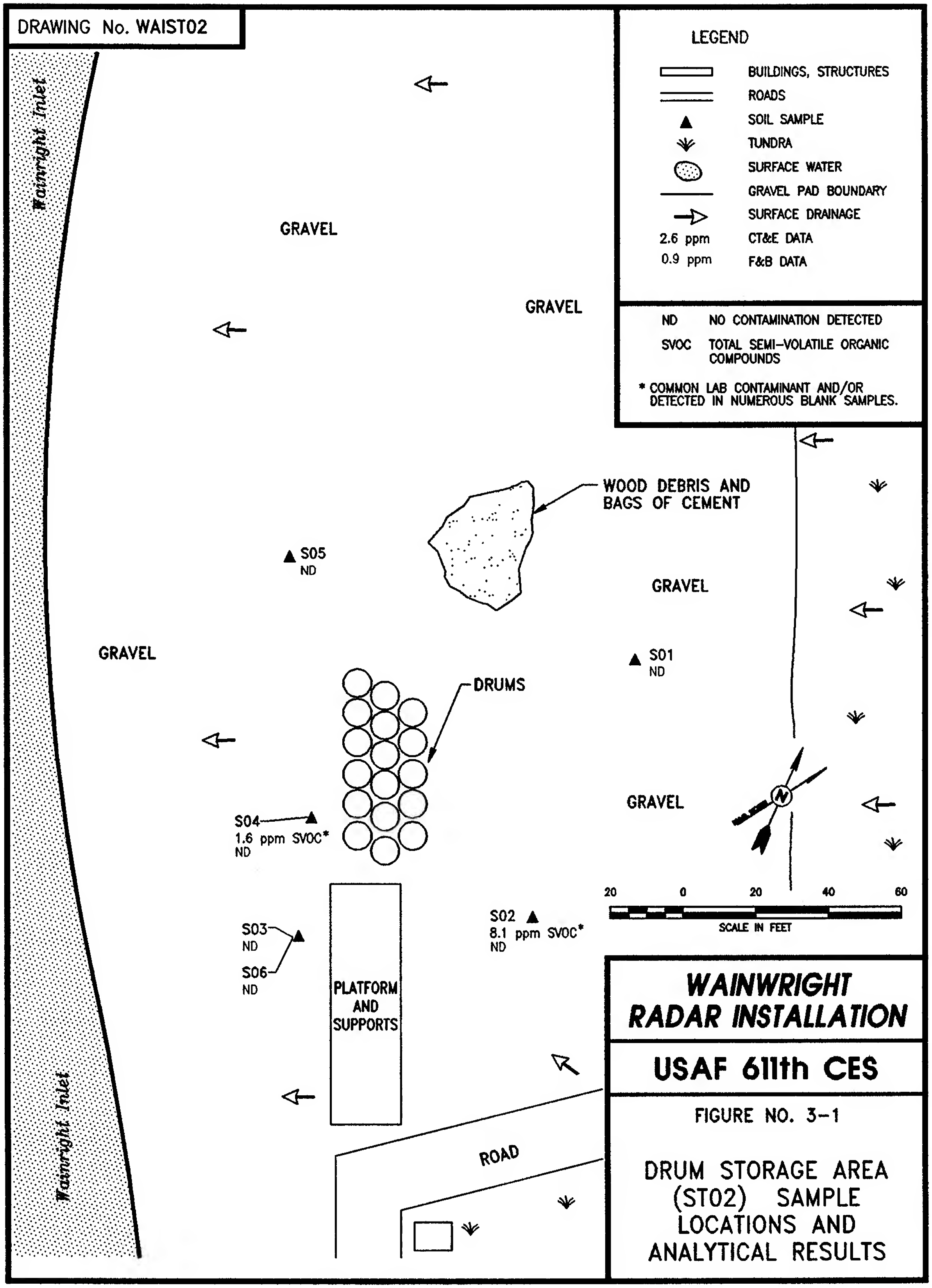
DRAWING No. WAIST02
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
ND NO CONTAMINATION DETECTED
SVOC TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
* COMMON LAB CONTAMINANT AND/OR DETECTED IN NUMEROUS BLANK SAMPLES.
Wainwright Inlet
GRAVEL
GRAVEL
WOOD DEBRIS AND BAGS OF CEMENT
S05
ND
GRAVEL
GRAVEL
S01
ND
DRUMS
GRAVEL
S04
1.6 ppm SVOC*
ND
S03
ND
S06
ND
PLATFORM AND SUPPORTS
S02
8.1 ppm SVOC*
ND
N
20 0 20 40 60
SCALE IN FEET
ROAD
Wainwright Inlet
WAINWRIGHT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 3-1
DRUM STORAGE AREA (ST02) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 3-1. DRUM STORAGE AREA ANALYTICAL DATA SUMMARY

Installation: Wainwright — Site: Drum Storage Area (ST02) — Matrix: Soil — Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd Levels	Environmental Samples						Field Blanks			Lab Blanks	
					S01	S02	S03 & S06 (Replicates)		S04	S05	AB01	EB01	TB01		
Laboratory Sample ID Numbers					1210	1212 4479-4	1214	1220	1216 4479-3	1218	1424	1280/1282 4479-7	1280 4479-8	#5-9193 #1&2-9293	4479 #6-83193 #3&4-9293
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-7	50-70	500[a]	<50[b]-<300J[b]	<70[b]	<60[b]	<70[b]	<60[b]	<60[b]	<50[b]	NA	<1,000[b]	NA	<1,000J	<50
GRPH	0.2	2	100	<2J[b]-<5J[b]	<2J[b]	<2J[b]	<2J[b]	<2[b]	<2J[b]	<2[b]	<50J[b]	<100J[b]	<100J[b]	<50J	<2J
RRPH (Approx.)	10-14	100-140	2,000[a]	<100-<600	<140	<120	<140	<120	<120	<100	NA	<2,000	NA	<2,000	<100
BTEX (8020/ 8020 Mod.)			10 Total BTEX	<0.10-<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Benzene	0.002	0.02	0.5	<0.02-<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<1	<1	<1	<1	<0.02
Toluene	0.002	0.02		<0.02-<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<1	<1	<1	<1	<0.02
Ethylbenzene	0.002	0.02		<0.02-<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<1	<1	<1	<1	<0.02
Xylenes (Total)	0.004	0.04		<0.04-<0.2	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<2	<2	<2	<2	<0.04
HVOC 8010	0.002	0.02		<0.02-<0.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<1	<10	<10	NA	<0.02
VOC 8260	0.020	0.02-0.03		<0.020-<0.400	NA	<0.030	NA	NA	<0.020	NA	NA	<1	<1	<1	<0.020
SVOC 8270															
di-n-Buthyl-phthalate	0.200	0.220-5.70	8,000	1.69U-83.4J	NA	8.08B	NA	NA	1.60B	NA	NA	<10	NA	<10	1.41
PCBs	0.01	0.1	10	<0.1-<2.8J	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<2J	NA	<2	<0.1

□ CT&E Data.
▒ F&B Data.
NA Not analyzed.
B Analyte was found in the associated blank.
J Result is an estimate.
U Compound is not present above the concentration listed.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 3-1. DRUM STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Drum Storage Area (ST02)
Matrix: Soil
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blank
					S02	S04						EB01		
Laboratory Sample ID Numbers					4479-4	4479-3						4479-7		4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg						µg/L		µg/L
Aluminum	0.35	2		1,500-25,000	9,600	2,600						<100		<100
Antimony	N/A	51-61		<7.8-<230	<61	<51						<100		<100
Arsenic	0.11	6.1-51		<4.9-8.5	<6.1	<51						<100		<100
Barium	0.24	1		27-390	150	180						<50		<50
Beryllium	N/A	26-31		<2.6-6.4	<31	<26						<50		<50
Cadmium	0.33	26-31		<3.0-<36	<31	<26						<50		<50
Calcium	0.69	4		360-59,000	910	15,000						410		327
Chromium	0.066	26-31		<4.3-47	<31	<26						<50		<50
Cobalt	N/A	1		<5.1-12	<6.1	15						<100		<100
Copper	0.045	1		<2.7-45	8.5	9.3						<50		<50
Iron	0.50	2		5,400-35,000	27,000	110,000						<100		<100
Lead	0.13	2		<5.1-22	<61	19						<100		<100
Magnesium	0.96	4		360-7,400	1,300	5,300						<200		<200
Manganese	0.025	1		25-290	170	1,400						<50		<50
Molybdenum	N/A	3.1-26		<2.5-<11	<3.1	<26						<50		<50
Nickel	0.11	1		4.2-46	12	24						<50		<50
Potassium	23	100		<300-2,200	930	590						<5,000		<5,000
Selenium	1.2	61-510		<7.8-<170	<61	<510						<100		<100

☐ CT&E Data.
N/A Not analyzed.

TABLE 3-1. DRUM STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Drum Storage Area (ST02)
Matrix: Soil
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blank
					S02	S04						EB01		
Laboratory Sample ID Numbers					4479-4	4479-3						4479-7		4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg						µg/L		µg/L
Silver	0.53	26-31		<3-<110	<31	<26						<50R		<50
Sodium	0.55	5		<160-680	170	840						410		<250
Thallium	0.011	0.25-0.30		<0.2-<1.2	<0.30	<0.25						<5		<5
Vanadium	0.036	1		6.3-59	35	39						<50		<50
Zinc	0.16	1		9.2-95	25	66						<50		<50

☐ CT&E Data.
R Result has been rejected.

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3.2 LANDFILL (LF05)

3.2.1 Site Background

The Landfill (LF05) site is located on the tundra, which slopes gently to the Kuk River, approximately 800 feet southwest of the MOGAS tanks on the south end of the main station area. The inactive Landfill covers approximately half an acre and is covered with gravel to a depth of approximately four feet. The Landfill received all wastes generated at the station from approximately 1974 to 1989.

Previous sampling, conducted in 1986, 1987, and 1990 by Air Force contractors, detected low levels of petroleum hydrocarbons and arsenic in a soil sample, and three VOCs and lead in a surface water sample. A detailed list of contaminants, source areas, and concentrations previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 3.2.3.

3.2.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Landfill (LF05) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

3.2.2.1 Summary of Samples Collected. A total of eight samples was collected from gravel pad, tundra, and streams at the site. These consisted of four soil, two sediment, and two surface water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Landfill (LF05) site are presented in Figure 3-2.

Four soil samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOC, and PCBs. In addition, one sample was analyzed for pesticides, VOCs, SVOCs, total metals, and TOC.

Two sediment samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOCs, and PCBs. In addition, one sample was analyzed for VOCs, SVOCs, total metals, and TOC.

Two surface water samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOCs, VOCs, SVOCs, PCBs, total and dissolved metals, TOC, TSS, and TDS.

3.2.2.2 Analytical Results. The data summary table (Table 3-2) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are listed for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds and inorganic analytes with samples collected from the site. Sample locations and analytical results for the samples are illustrated in Figure 3-2. All organic compounds detected are presented on the figure except when they were a result of laboratory

contamination or field decontamination procedures. In addition, metals detected above background levels that exceed an RBSL or ARAR are presented on Figure 3-2. The exceptions are presented on the data summary table.

Following are discussions of organic compounds and inorganic analytes detected above background levels at the site. A discussion of TDS, TSS, and TOC is included.

Organics. Organic compounds detected in soil and sediment samples collected at the site include DRPH, GRPH, BTEX compounds, one other VOC, and one SVOC. DRPH and GRPH were detected in one soil sample, LF05-S04-1.5, at 60 and 200 mg/kg, respectively. Three BTEX compounds were detected in the same sample. Total BTEX was detected at 9.59 mg/kg; xylenes were the primary component. One other VOC, 1,3,5-trimethylbenzene (a common component of diesel), was detected at low levels in soil sample LF05-S04-1.5.

In addition, one SVOC was detected in sediment sample LF05-SD02 that was also detected in the laboratory blanks and the background samples. Di-n-butylphthalate was detected at 37.6 mg/kg in the environmental sample and 1.41 mg/kg in the associated laboratory blank, and it ranged from 2.03 to 83.4 mg/kg in the background samples. Di-n-butylphthalate, a common laboratory contaminant, probably represents cross-contamination at the laboratory during analysis and is not representative of site conditions.

In surface water samples, one organic compound, 1,2-dichloroethane, was detected at 6 μg/L in sample LF05-SW02. This detection is assumed to be the result of field decontamination procedures. The hexane and methanol used in the decontamination procedures may have contained impurities including 1,2-dichloroethane. 1,2-Dichloroethane was detected in numerous field blank and background samples collected during the DEW Line RI investigations.

Inorganics. Metals analyses indicated that seven metals (barium, cadmium, iron, lead, manganese, sodium, and zinc) were detected above background concentrations in soil/sediment samples.

Six metals (aluminum, barium, iron, manganese, potassium, and zinc) were detected above background concentrations in surface water samples.

TOC was reported at 25,900 and 27,100 mg/kg in soil sample LF05-S04-1.5 and sediment sample LF05-SD02, respectively. TOC was reported at 231,000 and 64,600 μg/L, in surface water samples LF05-SW01 and LF05-SW02, respectively. TSS were reported at 105,000 and 68,000 μg/L, and TDS were reported at 1,060,000 and 90,000 μg/L in the same respective surface water samples.

3.2.2.3 Summary of Site Contamination. Previous sampling conducted at the Landfill (LF05) detected petroleum hydrocarbons and arsenic in a soil sample, and three VOCs and lead in a surface water sample. The results and the sources of previous sampling efforts are presented in the RI/FS Work Plan (U.S. Air Force 1993a). The quality of the previous IRP sampling data is unknown as is the data validation, if any, that these data have undergone.

Total petroleum hydrocarbon (TPH) was detected in a previous soil sample at 260 mg/kg, and arsenic was detected at 7.5 mg/kg.

VOCs previously detected in surface water include acetone, toluene, and xylenes. Acetone was detected at 2,000 μg/L. Toluene and xylenes were detected at 87 and 440 μg/L, respectively. Lead was previously detected in a surface water sample at 62 μg/L.

During the 1993 RI investigation, petroleum hydrocarbon compounds were detected in the soil at concentrations (60 mg/kg DRPH, 200 mg/kg GRPH) similar to previous sampling. Only one VOC was detected in a surface water sample at low concentrations and is probably related to decontamination procedures (see Section 3.2.1.4).

A comparison of historical data and current project data indicates similar concentrations of petroleum hydrocarbon compounds in soil/sediment and a decrease in the concentration of VOCs in surface water. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 3.2.4 and 3.2.5.

The suspected source of contaminants detected during sampling at the Landfill is previous waste disposal.

3.2.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

3.2.3.1 Topography and Stratigraphy. The Landfill (LF05) area consists of a gravel pad placed upon relatively flat tundra (Figure 3-2). The inactive Landfill is approximately four feet deep and is completely covered with gravel. The topography in the area slopes gently to the southeast.

The most prominent drainage feature in the area is a small stream that runs along the southeastern edge of the Landfill. A small, marshy tributary runs from the western edge of the Landfill to the stream. Drainage in the area is towards the tributary or the stream and hence to a relatively flat tundra area to the west.

During the 1993 RI, the active layer at the site was approximately two feet thick in tundra areas and four feet thick under gravel pads. Gravel pad materials at this site were of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Wainwright (Section 2.4.4.2).

3.2.3.2 Migration Potential.

Subsurface Migration. One of the soil samples collected from this site (near the middle of the Landfill) contained GRPH and other hydrocarbons associated with gasoline at concentrations below action levels. The site topography indicates that most active layer water should flow

towards either the small stream or the tributary stream. Because active layer water that drains from the site must enter these streams (and become surface water), the potential for offsite migration of contaminated active layer water is low. Onsite migration does not appear to be occurring. The only two contaminants detected in the tundra (1,2-dichloroethane and di-n-butylphthalate) are suspected to be due to laboratory and field contamination. Di-n-butylphthalate was detected in the associated laboratory blanks and background samples, and 1,2-dichloroethane is suspected to be a result of field decontamination procedures.

Surface Migration. Analytical results indicate that one surface water sample contained 1,2-dichloroethane. Because the sample was collected downstream of another sample that did not contain 1,2-dichloroethane, the occurrence of this compound is difficult to explain. The source of 1,2-dichloroethane is suspected to be field decontamination procedures. The hexane and methanol used in the decontamination procedures may have contained impurities including 1,2-dichloroethane. 1,2-Dichloroethane was detected in numerous field blank and background samples collected during the DEW Line RI investigations. The significance of 1,2-dichloroethane in this sample was evaluated in the risk assessment and is discussed in Section 3.2.4.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.5).

Summary of Migration Potential. Migration of contaminants does not appear to be occurring at the Landfill. None of the contaminants detected in the Landfill were detected in the surrounding tundra areas. The only two contaminants detected in the tundra are suspected to be due to laboratory and field contamination. Because downgradient areas of the Landfill are ringed by streams, the potential for offsite migration of contaminated active layer water is considered to be low.

3.2.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Landfill site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soils/sediments at the site. The primary routes of potential exposures at the site are incidental ingestion of soils/sediments and ingestion of surface water. Because groundwater and air at the Wainwright sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Wainwright Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children who may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with chemicals detected at the Landfill are presented in Section 3.2.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Wainwright Risk Assessment (U.S. Air Force 1996) to determine if chemicals detected at the Wainwright installation could potentially have an impact upon plants and animals. Because of the diversity of the plants and animals in the area of the installation, a set of representative species was selected for detailed evaluation in the ERA. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on the species' likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Wainwright. The potential ecological risks associated with the chemicals detected at the site are presented in Section 3.2.5.

3.2.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Landfill (LF05) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

3.2.4.1 Chemicals of Concern. GRPH and cadmium were identified as COCs for the soil matrix at the Landfill. The maximum concentration of GRPH exceeded both the background concentration and the ARAR concentration for petroleum hydrocarbon contamination of soil (ADEC 1991). The maximum concentration of cadmium exceeded the background level and the noncancer RBSL.

1,2-Dichloroethane was identified as a COC for the surface water at the Landfill. The maximum concentration of 1,2-dichloroethane exceeded the carcinogen RBSL and the ARAR for contamination of surface water.

Table 3-3, Identification of COCs at the Landfill, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

3.2.4.2 Potential Receptors and Exposure Pathways. Because COCs were identified for soil/sediment and surface water at the site, the potential risks associated with ingestion of soil/sediment and ingestion of surface water were evaluated in the risk assessment.

Three potential receptor groups were evaluated in the human health risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

3.2.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil at the Landfill by a hypothetical native northern adult/child is 0.02, and by a DEW Line worker is 0.002, based on the maximum concentration of the COCs. The presence of GRPH and cadmium accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations.

The excess lifetime cancer risk associated with the ingestion of soil at the Landfill by a hypothetical native northern adult/child is 6×10^{-8}, and by a DEW Line worker is 1×10^{-9}, based on the maximum concentration of the COC. The presence of GRPH accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

Noncancer Hazard and Cancer Risk Associated with Surface Water. The noncancer hazard associated with the ingestion of surface water at the Landfill by a hypothetical native northern adult is 0.423, and by a DEW Line worker is 0.033, based on the maximum concentration of the COC. The presence of manganese accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations.

The excess lifetime cancer risk associated with the ingestion of surface water at the Landfill by a hypothetical native northern adult is 8×10^{-6}, and by a DEW Line worker is 9×10^{-8}, based on the maximum concentration of the COC. The presence of 1,2-dichloroethane accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

3.2.4.4 Summary of Human Health Risk Assessment. The risks and hazards associated with the soil/sediment at the Landfill site are the very low noncancer hazards (hazard indices of 0.02 and 0.002), and the very low cancer risks associated with GRPH. These risks and hazards were estimated based on an ingestion rate for soil associated with a future residential scenario. It is very unlikely that the soil at this location would be ingested at the conservative rate used in the risk calculation, so the hazards and risks at the site are likely to be overestimated. Therefore, the noncancer and cancer risks associated with soil/sediment at the site are minimal. In addition, remedial action is generally not warranted at sites where the excess lifetime cancer risk is less than 1×10^{-4} (EPA 1991b), and on the basis of carcinogenic risk alone, remediation of the site is not necessarily warranted.

Surface water at the Landfill poses low noncancer hazards (hazard indices of 0.423 and 0.033) for the adult worker and native associated with manganese. The low cancer risks for surface water (hazard indices of 8×10^{-6} and 9×10^{-8}) are associated with 1,2-dichloroethane.

The potential noncancer hazards and cancer risks from surface water for an adult worker or native were calculated assuming the affected surface water would be used as a sole-source water supply for 180 days per year. Based on site-specific information, these chemicals in surface water do not currently pose a health hazard nor are they likely to pose a hazard in the future. The surface water expressions at the site are frozen most of the year; many are only intermittently filled with water during the summer months. The surface water at the site is not used for a water supply now, nor has it been used in the past. In conclusion, the COCs identified in surface water at the Landfill site pose only a minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site. In the unlikely event that surface water at the site is used as a sole-source of drinking water in the future, a potential noncancer hazard to human health could exist if current conditions remain constant.

3.2.5 Ecological Risk Assessment

The objective of the ERA was to estimate the potential impacts of chemicals detected at the installation on aquatic and terrestrial plants and animals. A summary of the approach used to assess potential ecological impacts is presented in Section 2.4.2.

3.2.5.1 Chemicals of Concern. COCs were selected based on criteria presented in Section 3.1 of the ERA. The average installation-wide concentrations of COCs were used to calculate the risk estimates. All sites at the installation were considered as potentially usable habitat because the installation has been inactive since 1989. Of the chemicals detected in soils/sediments and surface water at the site, DRPH, GRPH, ethylbenzene, xylene, 1,3,5-trimethylbenzene, aluminum, cadmium, iron, lead, manganese and zinc were identified as COCs; however, the only COCs that contributed to potential ecological risks were cadmium and iron in soil/sediment and aluminum, iron, and manganese in surface water.

3.2.5.2 Potential Receptors and Exposure Pathways. The potential ecological receptors evaluated in the ERA include plants, aquatic organisms, birds, and mammals likely to occur along the Arctic Coastal Plain. Representative species from these receptor groups were selected based primarily on the species' likelihood of exposure, preferred habitat, and feeding habits. No threatened or endangered species are expected to be in potential exposure pathways at the Wainwright installation, thus none are evaluated in the ERA. The representative species are presented in Table 2-6.

Ecological receptors can be exposed to COCs through abiotic and biotic media. Potential exposure pathways for terrestrial and aquatic organisms include direct contact with, and ingestion of, contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water. They may also be exposed to COCs through ingestion of plant and animal items in the diet, and incidental ingestion of soil/sediment while foraging, although these pathways are considered less significant and are not used to calculate HQs. Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items, and incidental ingestion of soil/sediment.

3.2.5.3 Risk Characterization. At the Landfill the only COCs that pose a potential hazard are cadmium and iron in soil/sediment, and aluminum, iron, and manganese in surface water. Potential hazards to terrestrial organisms were attributable to cadmium and iron. Cadmium HQs were 1, 2, and 60 for the brant, pectoral sandpiper, and brown lemming, respectively. Iron HQs were 3, 4, 40, and 20 for the Lapland longspur, brant, pectoral sandpiper, and brown lemming, respectively. Potential hazards to aquatic organisms were attributable to aluminum, iron, and manganese. The respective HQs for these COCs were 22, 28, and 9.5, for the nine-spined stickleback and 20, 28, and 1.7 for *Daphnia* spp.

3.2.5.4 Summary of Ecological Risk Assessment. The evaluation of potential adverse impacts to representative plant species indicates no apparent risks from COCs detected at the Landfill.

Although the HQs for aquatic organisms show a potential for hazard, it is important to qualify the hazard estimates at the Landfill site. The elevated concentrations were attributable to samples collected from seasonal drainages that freeze solid in the winter. As a result, these areas provide limited, if any, suitable habitat for fish, but may provide habitat for invertebrates. In addition, the potential hazards to aquatic species were based on total metal concentrations. If dissolved metal concentrations were used, the HQs and associated risk estimates for fish and invertebrates would probably be lower than those reported. Table 3-2 shows that in four of the six metal analyses the total metal concentrations exceed the dissolved metal concentrations for the COCs (aluminum, iron, and manganese). In the other two cases, the analyte was not detected (manganese <50 μg/L), and in the case of aluminum the dissolved concentration was only five percent greater than the total concentration. It should be noted that the total concentration should always exceed the dissolved metal concentrations, and abnormalities are due to analytical variances. Considering these factors, the overall risk to aquatic organisms at the Landfill site is low.

There also are factors that mitigate the elevated HQs estimated for birds and mammals. The hazard for cadmium is based on a single sediment sample collected downstream from the Landfill. Because no samples were collected upstream or downstream of the sample location, it is difficult to speculate on the extent of cadmium contamination. However, given that cadmium was detected in just one sample at the Wainwright installation, it seems reasonable to assume that the elevated concentrations are restricted to the vicinity of the Landfill. Considering the home range requirements of the representative avian species, it is unlikely that any bird would be exposed for a significant amount of time to contamination at that one location. As a result, the hazard to birds from cadmium is low. Also, due to the limited extent of the cadmium contamination, and the fact that the cadmium was detected in a sediment sample, it is unlikely that cadmium presents a threat to the brown lemming (the potential exposure pathway in this case is incidental ingestion of sediment).

Iron is an essential element that is regulated by animals, although it is not known how much iron is actually required in a species' diet. As a result, the iron concentrations at the Landfill site may not produce a toxic response. In addition, there is a great deal of uncertainty regarding the uptake of iron by plants, and the subsequent bioavailability of iron in the herbivorous portion of the species' diets. The ERA may overestimate hazard to the representative species from iron.

Consequently, in spite of estimated HQs greater than one, the threat from iron at the Landfill site is considered to be minimal.

The ERA indicates that, although there are a few instances of potential threat to individual species, overall the potential risks presented by the chemicals detected at the site are low.

3.2.6 Conclusions and Recommendations

Sampling and analyses have determined that there is no significant contamination at the Landfill (LF05) site. Only relatively low levels of contaminants were detected. Their source is suspected to be previous waste disposal at the Landfill, which is no longer active.

There does not appear to be any significant migration of contaminants from the site based on the surface water and sediment samples collected in drainage pathways leading from the site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Even using the conservative future scenario, the potential human health risks at the site are not of a magnitude that normally requires remedial action. Although the HQs for ecological receptors indicate low potential risks, these are based on very conservative estimates that probably overestimate the hazards to representative species, and overall risks to ecological receptors at the site are minimal. Based on the RI sampling and analyses, risk assessment, and current or future site uses, remedial actions are not warranted at the site. No significant human health or ecological risks were identified at the site. Therefore, the Landfill (LF05) site is recommended for no further action.

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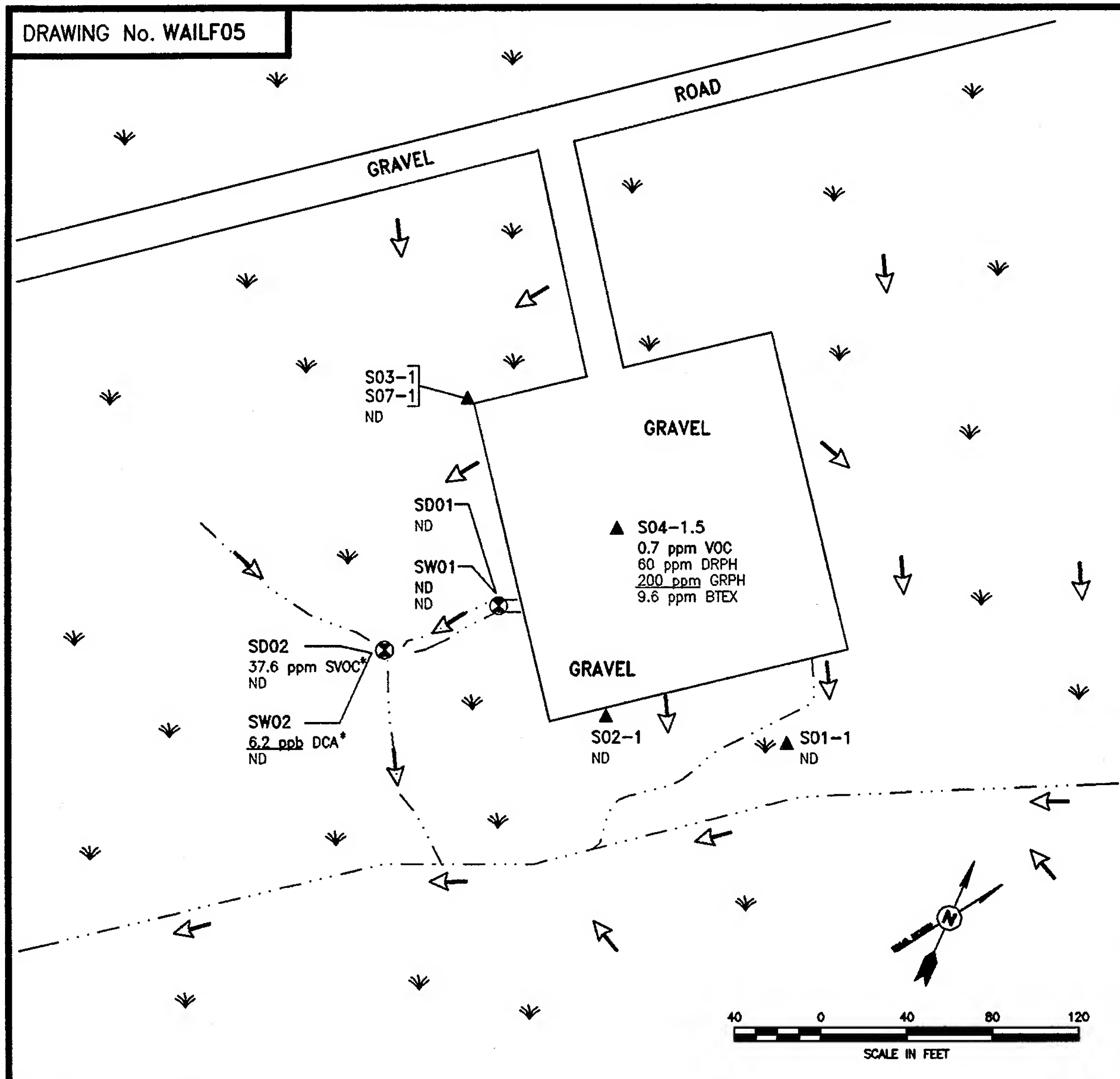

0000	CONCENTRATIONS ARE ABOVE ACTION LEVELS
ND	NO CONTAMINATION DETECTED
SVOC	TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
VOC	TOTAL VOLATILE ORGANIC COMPOUNDS
DRPH	DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH	GASOLINE RANGE PETROLEUM HYDROCARBONS
BTEX	TOTAL BTEX COMPOUNDS
DCA	1,2-DICHLOROETHANE

* COMMON LAB CONTAMINANT AND/OR DETECTED IN NUMEROUS BLANK SAMPLES.

LEGEND

- BUILDINGS, STRUCTURES
- ROADS
- SOIL SAMPLE
- SEDIMENT AND WATER SAMPLES
- TUNDRA
- GRAVEL PAD BOUNDARY
- DRAINAGE PATHWAY
- SURFACE DRAINAGE
- 2.6 ppm CT&E DATA
- 0.9 ppm F&B DATA

WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 3-2

LANDFILL (LF05) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY

Installation: Wainwright
Site: Landfill (LF05)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples S01-1	S02-1	S03-1 & S07-1 (Replicates)		S04-1.5	Field Blanks AB01	EB01	TB01	Lab Blanks	
Laboratory Sample ID Numbers					1222	1224	1226	1230	1228 4479-2	1424	1280/1282 4479-7	1260 4479-8	#5-9193 #1&2-9293 4479	#6-9393 #6-83193 #3&4-9293 4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	7-12	70-120	500[a]	<50[b]-<300J[b]	<110[b]	<120[a]	<70[b]	<100[b]	80[b]	NA	<1,000[a]	NA	<1,000J	<50
GRPH	0.2-0.4	2-4	100	<2J[a]-<5J[b]	<4[b]	<4[a]	<2J[b]	<2J[b]	200J[b]	<50J[b]	<100J[a]	<100J[b]	<50J	<2J
RRPH (Approx.)	12-24	120-240	2,000[a]	<100-<800	<220	<240	<140	<140	<120	NA	<2,000	NA	<2,000	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	<0.20	<0.20	<0.10	<0.10J	9.59J					
Benzene	0.002-0.004	0.02-0.04	0.5	<0.02-<0.1	<0.04	<0.04	<0.02	<0.02J	<0.02	<1	<1	<1	<1	<0.02
Toluene	0.002-0.004	0.02-0.04		<0.02-<0.1	<0.04	<0.04	<0.02	<0.02	0.09J	<1	<1	<1	<1	<0.02
Ethylbenzene	0.002-0.004	0.02-0.04		<0.02-<0.1	<0.04	<0.04	<0.02	<0.02	1.5J	<1	<1	<1	<1	<0.02
Xylenes (Total)	0.004-0.008	0.04-0.08		<0.04-<0.2	<0.08	<0.08	<0.04	<0.04	8J	<2	<2	<2	<2	<0.04
HVOC 8010	0.002-0.004	0.02-0.04		<0.02-<0.5	<0.04	<0.04	<0.02	<0.02	<0.02	<10	<10	<10	<10	<0.02
VOC 8260														
Toluene	0.020	0.2-0.3		<0.020-<0.400	NA	NA	NA	NA	0.205	NA	<1	<1	<1	<0.020
1,3,5-Trimethylbenzene	0.020	0.2-0.3		<0.020-<0.400	NA	NA	NA	NA	0.247	NA	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.4-0.6		<0.020-<0.400	NA	NA	NA	NA	0.211	NA	<1	<1	<2	<0.040
SVOC 8270	0.20	0.21		1.69U-83.4J	NA	NA	NA	NA	<0.21-3.41U	NA	<10	NA	<10	1.41

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate
U Compound is not present above the concentration listed.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright — Matrix: Soil
Site: Landfill (LF05) — Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks	
					S01-1	S02-1	S03-1 & S07-1 (Replicates)		S04-1.5	AB01	EB01	TB01		
Laboratory Sample ID Numbers					1222	1224	1226	1230	1228 4479-2	1424	1280/1282 4479-7	1260 4479-8	#5-9193 4479	#6-9393 #6-83193 4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
Pesticides	0.001-0.05	0.01-0.5		<0.01J-<2.8J	NA	NA	NA	NA	<0.01J-0.5J	NA	<0.2J-<10J	NA	NA	<0.5
PCBs	0.01	0.1	10	<0.1-<2.8J	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<2J	NA	<2	<0.1
TOC				10,500-44,100	NA	NA	NA	NA	25,900	NA	<5,000	NA	<5,000	NA

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Landfill (LF05)
Matrix: Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples		Field Blanks			Lab Blanks	
					SD01	SD02	AB01	EB01	TB01		
Laboratory Sample ID Numbers					1232	1234 4479-1	1424	1280/1284 4479-7	1260 4479-8	#5-9193 #1&2-9293	#6-83193 #3&4-9293 4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	13-49	130-490	500[a]	<50[b]-<300J[b]	<490[b]	<130[b]	NA	<1,000[b]	NA	<1,000J	<50
GRPH	0.6-0.8	6-8	100	<2J[b]-<5J[b]	<8J[b]	<6J[b]	<50J[b]	<100J[b]	<100J[b]	<50J	<2J
RRPH (Approx.)	26-43	260-430	2,000[a]	<100-<600	<430	<260	NA	<2,000	NA	<2,000	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	<0.45J	<0.25J					
Benzene	0.005-0.009	0.05-0.09	0.5	<0.02-<0.1	<0.09J	<0.05J	<1	<1	<1	<1	<0.02
Toluene	0.005-0.009	0.05-0.09		<0.02-<0.1	<0.09	<0.05	<1	<1	<1	<1	<0.02
Ethylbenzene	0.005-0.009	0.05-0.09		<0.02-<0.1	<0.09	<0.05	<1	<1	<1	<1	<0.02
Xylenes (Total)	0.01-0.018	0.1-0.18		<0.04-<0.2	<0.18	<0.1	<2	<2	<2	<2	<0.04
HVOC 8010	0.002	0.02		<0.02-<0.5	<0.02	<0.02	<1	<10	<10	NA	<0.02
VOC 8260	0.020	0.3		<0.020-<0.400	NA	<0.3	NA	<1	<1	<1	<0.020
SVOC 8270											
di-n-Butylphthalate	0.200	3.2	8,000	1.69U-83.4J	NA	37.6J	NA	<10	NA	<10	1.41
PCBs	0.03-0.04	0.3-0.4	10	<0.1J-<2.8J	<0.4	<0.3	NA	<2J	NA	<2	<0.1
TOC				10,500-44,100	NA	27,100	NA	<5,000	NA	<5,000	NA

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
U Compound is not present above the concentration listed.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Landfill (LF05)
Matrix: Soil/Sediment
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples					Field Blank			Lab Blank
					S04-1.5	SD02					EB01		
Laboratory Sample ID Numbers					4479-2	4479-1					4479-7		4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					µg/L		µg/L
Aluminum	0.35	2		1,500-25,000	1,900	15,000					<100		<100
Antimony	N/A	51-150		<7.8-<230	<51J	<150J					<100		<100
Arsenic	0.11	51-150		<4.9-8.5	<51	<150					<100		<100
Barium	0.024	1		27-390	250	420					<50		<50
Beryllium	N/A	7.2-26		<2.6-64	<26	<7.2					<50		<50
Cadmium	0.33	1-26		<3.0-<36	<26	72					<50		<50
Calcium	0.69	4		360-59,000	2,700	4,950					410		327
Chromium	0.066	1-26		<4.3-47	<26	26					<50		<50
Cobalt	N/A	1-15		<5.1-12	12	<15					<100		<100
Copper	0.045	1		<2.7-45	41	14					<50		<50
Iron	0.50	2		5,400-35,000	99,000	25,000					<100		<100
Lead	0.13	2-15		<5.1-22	37	<15					<100		<100
Magnesium	0.96	4		360-7,400	1,900	3,100					<200		<200
Manganese	0.025	1		25-290	1,100J	67J					<50		<50
Molybdenum	N/A	7.2-26		<2.5-<11	<26	<7.2					<50		<50
Nickel	0.11	1		4.2-46	25	15					<50		<50
Potassium	23	100		<300-2,200	510J	1,500J					<5,000		<5,000
Selenium	1.2	150-510		<7.8-<170	<510	<150					<100		<100

☐ CT&E Data.
N/A Not available.
J Result is an estimate

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Landfill (LF05)

Matrix: Soil/Sediment
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples					Field Blank			Lab Blank
					S04-1.5	SD02					EB01		
Laboratory Sample ID Numbers					4479-2	4479-1					4479-7		4479
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					µg/L		µg/L
Silver	0.53	26-72		<3-<110	<26R	<72R					<50R		<50
Sodium	0.55	5		<160-680	84	1,500					410		<250
Thallium	0.011	0.26-0.82		<0.2-<1.2	<0.26	<0.82					<5		<5
Vanadium	0.036	1		6.3-59	30	43					<50		<50
Zinc	0.16	1		9.2-95	150	30					<50		<50

☐ CT&E Data.
R Result has been rejected.

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Landfill (LF05)
Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples				Field Blanks			Lab Blanks
					SW01	SW02			AB01	EB01	TB01	
Laboratory Sample ID Numbers					1255/1256 1258 4478-1	1250/1252 4478-2			1424	1280/1282 4479-7	1260 4479-8	#5-9193 #1&2-9293 4478/4479
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			µg/L	µg/L	µg/L	µg/L
DRPH	100	1,000		<1,000J[b]	<1,000[b]	<1,000[b]			NA	<1,000[b]	NA	<1,000J
GRPH	10	100		<50J[b]-<100J[b]	<100J[b]	<100J[b]			<50J[b]	<100J[b]	<100J[b]	<50J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000			NA	<2,000	NA	<2,000
BTEX (8020/8020 Mod.)												
Benzene	0.1	1	5	<1	<1	<1			<1	<1	<1	<1
Toluene	0.1	1	1,000	<1	<1	<1			<1	<1	<1	<1
Ethylbenzene	0.1	1	700	<1	<1	<1			<1	<1	<1	<1
Xylenes (Total)	0.2	2	10,000	<2	<2	<2			<2	<2	<2	<2
HVOC 8010	1	10		<5-<10	<10	<10			<1	<10	<10	NA
VOC 8260												
1,2-Dichloroethane	1	1	5	<1	<1	6.2			NA	<1	<1	<1
SVOC 8270	10	10-12		<10-<13	<10	<12			NA	<10	NA	<10
PCBs	0.2	2	0.5	<2J	<2	<2			NA	<2J	NA	<2
TOC	5,000	5,000		7,480	231,000	64,600			NA	<5,000	NA	<5,000
TSS	100	200		7,000-35,000	105,000	68,000			NA	NA	NA	<100
TDS	10,000	10,000		91,000-151,000	1,060,000J	90,000			NA	NA	NA	<10,000

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Landfill (LF05)

Matrix: Surface Water
Units: µg/L

METALS ANALYSES: TOTAL
(DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples					Field Blank			Lab Blanks
					SW01	SW02					EB01		
Laboratory Sample ID Numbers					4478-1	4478-2					4479-7		4478 4479
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					µg/L		µg/L
Aluminum	17.4	100		<100-350 (<100-340)	2,100 (2,200)	180 (<100)					<100		<100
Antimony	N/A	100	6	<100 (<100)	<100 (<100)	<100 (<100)					<100		<100
Arsenic	5.3	100	50	<100 (<100)	<100 (<100)	<100 (<100)					<100		<100
Barium	1.2	50	2,000	<50-93 (50-91)	230 (230)	53 (<50)					<50		<50
Beryllium	N/A	50	4	<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Cadmium	1.7	50	5	<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Calcium	34.5	200		4,500-88,000 (4,100-86,000)	24,000 (23,000)	6,000 (5,200)					410		<200
Chromium	3.29	50	100	<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Cobalt	N/A	100		<100 (<100)	<100 (<100)	<100 (<100)					<100		<100
Copper	2.3	50	1,300	<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Iron	25	100		180-2,800 (<100-1,600)	23,000 (21,000)	1,600 (480)					<100		<100
Lead	6.6	100	15	<100 (<100)	<100 (<100)	<100 (<100)					<100		<100
Magnesium	47.8	200		<5,000-53,000 (2,600-54,000)	26,000 (27,000)	6,000 (5,000)					<200		<200

☐ CT&E Data.
N/A Not available.

TABLE 3-2. LANDFILL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright Matrix: Surface Water METALS ANALYSES: TOTAL (DISSOLVED)
Site: Landfill (LF05) Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples					Field Blank			Lab Blanks
					SW01	SW02					EB01		
Laboratory Sample ID Numbers					4478-1	4478-2					4479-7		4478 4479
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					µg/L		µg/L
Manganese	1.24	50		<50-510 (<50-120)	150 (130)	<50 (<50)					<50		<50
Molybdenum	N/A	50		<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Nickel	5.5	50	100	<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Potassium	1,154	5,000		<5,000 (<5,000)	9,500 (11,000)	<5,000 (<5,000)					<5,000		<5,000
Selenium	62.4	100	50	<100 (<100)	<100 (<100)	<100 (<100)					<100		<100
Silver	2.6	50	50	<50 (<50)	<50 (<50)J	<50 (<50)					<50R		<50
Sodium	27.7	200		8,400-410,000 (8,200-450,000)	110,000 (130,000)	18,000 (10,000)					410		410
Thallium	0.57	5	2	<5 (<5)	<5 (<5)	<5 (<5)					<5		<5
Vanadium	1.8	50		<50 (<50)	<50 (<50)	<50 (<50)					<50		<50
Zinc	8.2	50		<50-160 (<50)	230J (160)	<50 (<50)					<50		<50

☐ CT&E Data.
N/A Not available.
J Result is an estimate.
R Result has been rejected.

TABLE 3-3. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE LANDFILL (LF05)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b]		ARAR[c]	CHEMICAL OF CONCERN[d]
						CANCER	NON-CANCER		
Landfill (LF05)	Soil/Sediment	DRPH	60	mg/kg	<50-<300J	--	--	500[e]	No
		GRPH	200J	mg/kg	<2J-<5J	--	--	100[e]	**Yes**
		di-n-Butylphthalate	37.6J	mg/kg	1.69U-83.4J	--	2,700	8,000[f]	No
		Ethylbenzene	1.5J	mg/kg	<0.020-<0.400	--	2,700		No
		Toluene	0.205	mg/kg	<0.020-<0.400	--	5,400	--	No
		1,3,5-Trimethylbenzene	0.247	mg/kg	<0.020-<0.400	--	--	--	**Yes***
		Xylenes	8J	mg/kg	<0.040-<0.200	--	54,000	--	No
		Aluminum	15,000	mg/kg	1,500-25,000	--	--	--	No
		Barium	420	mg/kg	27-390	--	1,890	--	No
		Cadmium	72	mg/kg	<3.0-<36	--	27	--	**Yes**
		Calcium	4,950	mg/kg	360-59,000	--	--	--	No
		Chromium	26	mg/kg	<4.3-47	--	135	--	No
		Cobalt	12	mg/kg	<5.1-12	--	--	--	No

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5. (U.S. Air Force 1996).
J Result is an estimate.
U Compound is not present above the concentration listed.
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are consisered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e Target cleanup levels for DRPH, GRPH, and RRPH in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.
f 55 FR 30798, Proposed Rule RCRA Corrective Action for SWMUs 40 CFR [Section 264.521(a)(2)(i-iv)], Health-Based Criteria for Systemic Toxicant.
g EPA 1991c.
h MCL, 52 FR 25690 (08 Jul 1989).
i MCL, 56 FR 30266 (01 Jul 1991).
j Secondary MCL for Zinc, 54 FR 22062 (22 May 1989).

TABLE 3-3. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE LANDFILL (LF05) (CONTINUED)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b]		ARAR[c]	CHEMICAL OF CONCERN[d]
						CANCER	NON-CANCER		
Landfill (LF05) (Continued)	Soil/Sediment (Continued)	Copper	41	mg/kg	<2.7-45	--	999	--	No
		Iron	99,000	mg/kg	5,400-35,000	--	--	--	No
		Lead	37	mg/kg	<5.1-22	--	--	500[g]	No
		Magnesium	3,100	mg/kg	360-7,400	--	--	--	No
		Manganese	1,100J	mg/kg	25-290	--	3,780	--	No
		Nickel	25	mg/kg	4.2-46	--	540	--	No
		Potassium	1,500J	mg/kg	<300-2,200	--	--	--	No
		Sodium	1,500	mg/kg	<160-680	--	--	--	No
		Vanadium	43	mg/kg	6.3-59	--	189	--	No
		Zinc	150	mg/kg	9.2-95	--	8,100	--	No
	Surface Water	1,2-Dichloroethane	6.2	µg/L	<1	0.934	--	5[h]	**Yes**
		Aluminum	2,100	µg/L	<100-350	--	--	--	**Yes***
		Barium	230	µg/L	<50-93	--	256	2,000[i]	No
		Calcium	24,000	µg/L	4,500-88,000	--	--	--	No

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5. (U.S. Air Force 1996).
J Result is an estimate.
U Compound is not present above the concentration listed.
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are consisered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e Target cleanup levels for DRPH, GRPH, and RRPH in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.
f 55 FR 30798, Proposed Rule RCRA Corrective Action for SWMUs 40 CFR [Section 264.521(a)(2)(i-iv)], Health-Based Criteria for Systemic Toxicant.
g EPA 1991c.
h MCL, 52 FR 25690 (08 Jul 1989).
i MCL, 56 FR 30266 (01 Jul 1991).
j Secondary MCL for Zinc, 54 FR 22062 (22 May 1989).

TABLE 3-3. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE LANDFILL (LF05) (CONTINUED)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b]		ARAR[c]	CHEMICAL OF CONCERN[d]
						CANCER	NON-CANCER		
Landfill	Surface Water	Iron	23,000	µg/L	100-2,800	--	--	--	No
(LF05)	(Continued)	Magnesium	26,000	µg/L	<5,000-53,000	--	--	--	No
(Continued)		Manganese	150	µg/L	<50-510	--	18.3	--	No
		Potassium	9,500	µg/L	<5,000	--	--	--	No
		Sodium	110,000	µg/L	8,400-410,000	--	--	--	No
		Zinc	230J	µg/L	<50-160	--	1,100	5,000[j]	No

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5. (U.S. Air Force 1996).
J Result is an estimate.
U Compound is not present above the concentration listed.
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are consisered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e Target cleanup levels for DRPH, GRPH, and RRPH in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.
f 55 FR 30798, Proposed Rule RCRA Corrective Action for SWMUs 40 CFR [Section 264.521(a)(2)(i-iv)], Health-Based Criteria for Systemic Toxicant.
g EPA 1991c.
h MCL, 52 FR 25690 (08 Jul 1989).
i MCL, 56 FR 30266 (01 Jul 1991).
j Secondary MCL for Zinc, 54 FR 22062 (22 May 1989).

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3.3 AIRSTRIP DIESEL (SS08)

3.3.1 Site Background

The Airstrip Diesel (SS08) site is located adjacent to the north side of the airstrip at the junction of the road to Freshwater Lake. The area consists of tundra and a gravel pad elevated approximately four feet above the adjacent tundra. A helicopter pad was under construction at this site during the 1993 field sampling season.

Previous sampling, conducted in 1992 by Air Force contractors, detected petroleum compounds a soil sample (ENSR 1992); however, no documentation has been found of spills at this site. A detailed list of contaminants, the source area, and concentrations previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

3.3.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Airstrip Diesel (SS08) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

3.3.2.1 Summary of Samples Collected. A total of seven samples was collected from ponded areas at the site. These consisted of four sediment and three surface water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Airstrip Diesel (SS08) are presented in Figure 3-3.

Four sediment samples were analyzed for DRPH and RRPH. In addition, four samples were analyzed for GRPH and BTEX. One sample was analyzed for VOCs.

Three surface water samples were analyzed for DRPH, GRPH, RRPH, and BTEX. In addition, one sample was analyzed for VOCs, SVOCs, pesticides, TOC, TSS, and TDS.

3.3.2.2 Analytical Results. The data summary table (Table 3-4) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds with samples collected from the site. Sample locations and analytical results for the samples are illustrated in Figure 3-3. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. These exceptions are presented on the data summary table.

Following are discussions of organic compounds detected above background levels at the site. A discussion of TDS, TSS, and TOC is included.

Organics. No organic compound was detected in sediment or surface water samples from this site.

Inorganics. Metals were not a concern at this site, and no metals analysis was performed. TOC, TSS, and TDS were reported at 24,100; 18,000; and 457,000 μg/L, respectively, in surface water sample SS08-SW02.

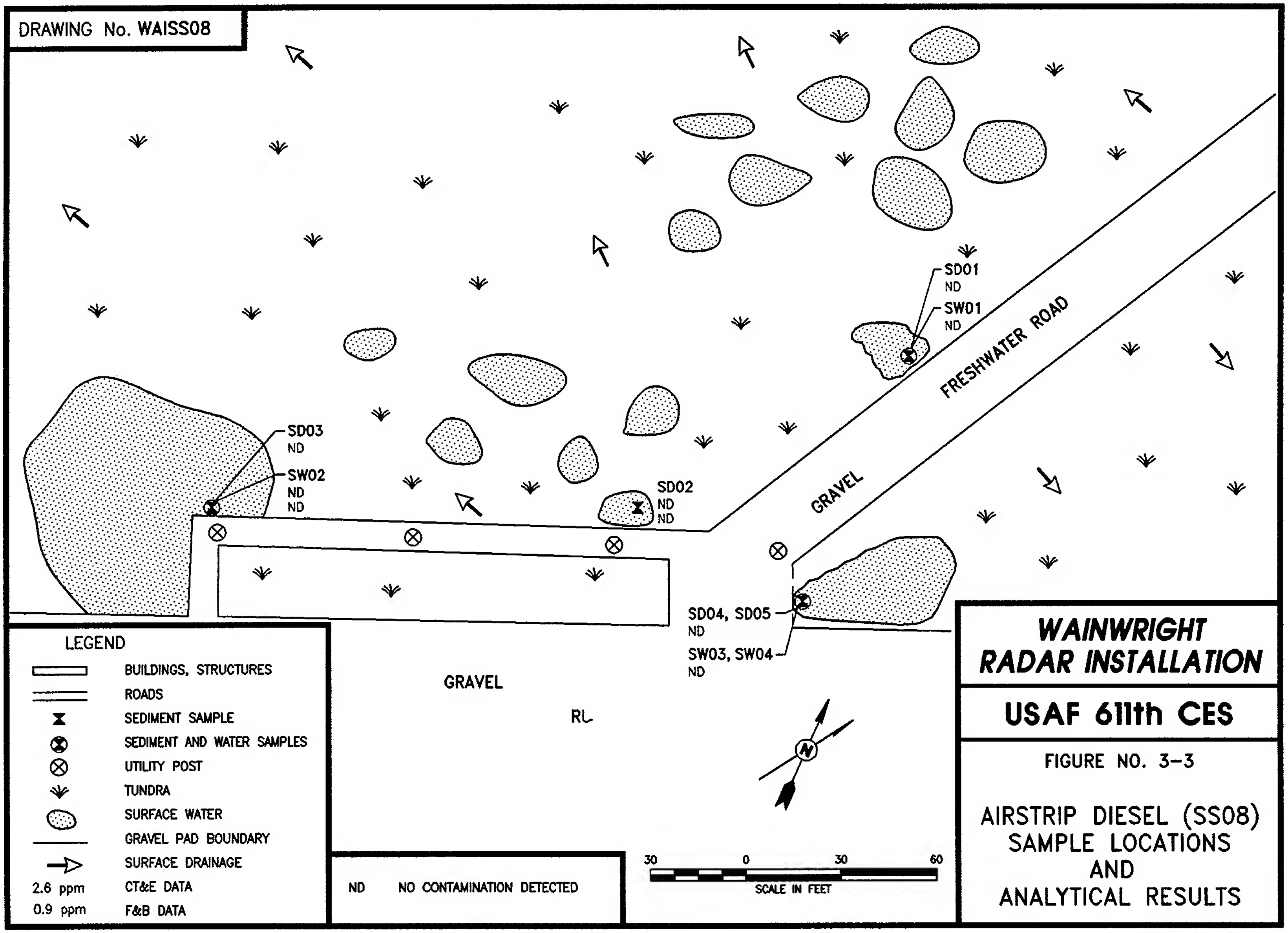
3.3.2.3 Summary of Site Contamination. Previous sampling conducted at the Airstrip Diesel (SS08) site detected diesel range organics at 824 mg/kg in a soil sample. No previous surface water sampling was conducted at the site. The results of previous sampling efforts are presented in the RI/FS Work Plan (U.S. Air Force 1993a). The quality of the previous IRP sampling data is unknown as is the data validation, if any, that these data have undergone.

No contaminant was detected in the nine RI samples from the site, so trends, migration pathways, and risks to human health and the environment are not a concern. The one previous detection of diesel range organics appears to be very limited in extent and/or biogenic in nature.

3.3.3 Conclusions and Recommendations

RI sampling and analyses have determined that the Airstrip Diesel (SS08) is not contaminated. No contaminant was detected in site samples, so there appears to be no potential for contaminant migration or risks posed by the site to human or ecological receptors.

Based on RI sampling and analyses, the Airstrip Diesel (SS08) site is recommended for no further action.



DRAWING No. WAISS08
SD01
ND
SW01
ND
FRESHWATER ROAD
GRAVEL
SD03
ND
SW02
ND
ND
SD02
ND
ND
SD04, SD05
ND
SW03, SW04
ND
GRAVEL
RL
LEGEND
BUILDINGS, STRUCTURES
ROADS
SEDIMENT SAMPLE
SEDIMENT AND WATER SAMPLES
UTILITY POST
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
ND NO CONTAMINATION DETECTED
30 0 30 60
SCALE IN FEET
N
WAINWRIGHT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 3-3
AIRSTRIP DIESEL (SS08) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 3-4. AIRSTRIP DIESEL ANALYTICAL DATA SUMMARY

Installation: Wainwright
Site: Airstrip Diesel (SS08)
Matrix: Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks	
					SD01	SD02	SD03	SD04 & SD05 (Replicates)		AB01	EB01	TB01		
Laboratory Sample ID Numbers					1240	1242 4480-1	1244	1246	1248	1424	1280/1282 4479-7	1260 4479-8	#5-9193 #1&2-9293 4479	#6-83193 #3&4-9293 4480
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	7.4-18	74-180	500[a]	<50[b]-<300J[b]	<81[b]	<74[b]	<135[b]	<120[b]	<180[b]	NA	<1,000[b]	NA	<1,000J	<50
GRPH	0.3-0.5	3-5	100	<2J[b]-<5J[b]	<3J[b]	<3J[b]	<5J[b]	<5J[b]	NA	<50J[b]	<100J[b]	<50[b]	<50J	<2J
RRPH (Approx.)	14-36	140-360	2,000[a]	<100-<600	<160	<140	<280	<250	<360	NA	<2,000	NA	<2,000	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	<0.15	<0.15	<0.25	<0.87J	NA					
Benzene	0.003-0.005	0.03-0.05	0.5	<0.02-<0.1	<0.03	<0.03	<0.05	<0.05	NA	<1	<1	<1	<1	<0.02
Toluene	0.003-0.05	0.03-0.5		<0.02-<0.1	<0.03	<0.03	<0.05	<0.6J	NA	<1	<1	<1	<1	<0.02
Ethylbenzene	0.003-0.005	0.03-0.05		<0.02-<0.1	<0.03	<0.03	<0.05	<0.04	NA	<1	<1	<1	<1	<0.02
Xylenes (Total)	0.006-0.001	0.06-0.1		<0.04-<0.2	<0.06	<0.08	<0.1	<0.08	NA	<2	<2	<2	<2	<0.04
VOC 8260	0.020	0.025		<0.020-<0.400	NA	<0.025	NA	NA	NA	NA	<1	<1	<1	<0.020

☐ CT&E Data.
▒ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 3-4. AIRSTRIP DIESEL ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright   Matrix: Surface Water
Site: Airstrip Diesel (SS08)   Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples				Field Blanks			Lab Blanks
					SW01	SW02	SW03 & SW04 (Duplicates)		AB01	EB01	TB01	
Laboratory Sample ID Numbers					1267/1268	1262/1264 4480-2	1271/1272	1275/1276	1424	1280/1282 4479-7	1260 4479-8	#5-9193 #1&2-9293 4479/4480
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DRPH	100	1,000		<1,000J[b]	<1,000[b]	<1,000[b]	<1,000[b]	<1,000[b]	NA	<1,000[b]	NA	<1,000J
GRPH	10	100		<50J[b]-<100J[b]	<100J[b]	<100J[b]	<100J[b]	<100J[b]	<50J[b]	<100J[b]	<100J[b]	<50J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000	<2,000	<2,000	NA	<2,000	NA	<2,000
BTEX (8020/8020 Mod.)												
Benzene	0.1	1	5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	0.1	1	1,000	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	0.1	1	700	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes (Total)	0.2	2	10,000	<2	<2	<2	<2	<2	<2	<2	<2	<2
VOC 8260	1	1		<1	NA	<1	NA	NA	NA	<1	<1	<1
SVOC 8270	10	10		<10-<13	NA	<10	NA	NA	NA	<10	NA	<10
Pesticides	0.02-1	0.2-10		<0.2J-<25J	NA	<0.2J-<10J	NA	NA	NA	<0.2J-<10J	NA	<0.01J-<0.5J
TOC	5,000	5,000		7,480	NA	24,100	NA	NA	NA	<5,000	NA	<5,000
TSS	100	200		7,000-35,000	NA	18,000	NA	NA	NA	NA	NA	<100
TDS	10,000	10,000		91,000-151,000	NA	457,000	NA	NA	NA	NA	NA	<10,000

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

3.4 VEHICLE STORAGE AREA (SS09)

3.4.1 Site Background

The Vehicle Storage Area (SS09) site consists of a gravel pad that was historically used for vehicle storage. The site is approximately 100 yards southeast of the module train in the vicinity of the new SRR System. New construction on and adjacent to the site includes the SRR tower, a technical services building, and two satellite ground terminals. A gravel pad was added to the original Vehicle Storage Area and adjacent road during construction of the SRR structures. During the current construction activities, soil boring materials that were considered potentially contaminated were stockpiled north of the Vehicle Storage Area site. The stockpiled soils were sampled as part of the RI at the site.

Previous sampling, conducted in 1989 by Air Force contractors, detected petroleum hydrocarbon compounds in soil. A detailed list of source areas, contaminants, and concentrations previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 3.4.3.

3.4.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Vehicle Storage Area (SS09) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

3.4.2.1 Summary of Samples Collected. A total of 13 soil samples was collected at the site. These consisted of seven soil, two stockpiled soil, two sediment, and two surface water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Vehicle Storage Area (SS09) are presented in Figure 3-4.

Seven soil samples were analyzed for DRPH, GRPH, RRPH, BTEX, and HVOCs. In addition, six samples were analyzed for PCBs. Two samples were analyzed for VOCs and total metals.

The two stockpiled soil samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOCs, VOCs, SVOCs, totals metals, and TOC.

The two sediment samples were analyzed for DRPH, GRPH, RRPH, BTEX, and HVOCs. In addition, one sample was analyzed for PCBs.

The two surface water samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOCs, VOCs, SVOCs, PCBs, total metals, TSS, and TDS. In addition, one sample was analyzed for pesticides and TOC.

3.4.2.2 Analytical Results. The data summary table (Table 3-5) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds and inorganic analytes with samples collected from the site. Sample locations and analytical results for the samples are illustrated in Figure 3-4. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or decontamination procedures. In addition, only metals detected above background levels that exceed an RBSL or ARAR are presented on Figure 3-4. These exceptions are presented on the data summary table.

Following are discussions of organic compounds and inorganic analytes detected above background levels at the site. A discussion of the TSS, TDS, and TOC is included.

Organics. Organic compounds detected in soil and sediment samples at the site include two BTEX compounds and low levels of four other VOCs. Three of the compounds (tetrachloroethene, toluene, and trichloroethene) were detected at low concentrations (0.062 to 0.330 mg/kg) in soil sample SS09-S03-4. All other organic compounds were detected at low levels (0.025 to 0.694 mg/kg) in the stockpiled soil samples (samples STKP-S01 and STKP-S02).

Inorganics. No metal was detected above background concentrations in soil/sediment samples collected at the site.

In surface water samples, eight metals (aluminum, barium, iron, magnesium, manganese, nickel, vanadium, and zinc) were detected above background concentrations. TOC in soil was reported at 9,880 and 6,780 mg/kg in samples STKP-S01 and STKP-S02, respectively. TOC in water was reported at 107,000 mg/kg in sample SS09-SW01. TSS were reported at 750,000 and 15,000 mg/kg in surface water samples SS09-SW01 and SS09-2SW02, respectively. TDS were reported at 587,000 and 425,000 mg/kg in the same respective samples.

3.4.2.3 Summary of Site Contamination. Previous sampling conducted at the Vehicle Storage Area (SS09) detected DRO, GRO, and xylenes. The results and the sources of previous sampling efforts are presented in the RI/FS Work Plan (U.S. Air Force 1993a). The quality of the previous IRP sampling data is unknown as is the data validation, if any, that these data have undergone.

DRO were detected in five previous soil samples at concentrations ranging from 1,000 to 3,810 mg/kg. GRO and xylenes were detected in one previous soil sample at concentrations of 10 and 0.2 mg/kg, respectively.

During the 1993 RI investigation, no petroleum hydrocarbon contamination was detected during sampling conducted at the Vehicle Storage Area (SS09) site or the associated stockpiled soil area. Very low levels of VOCs that are common components of diesel fuel were detected in the stockpiled soil area and in an isolated area at the Vehicle Storage Area. The source of the limited low levels of VOCs detected at the site is unknown but is probably related to former

activities at the site. The contaminants detected are isolated to a small area in the southern section of the site and do not appear to be migrating.

A comparison of historical and current project data indicates a decrease in the concentration of petroleum compounds and VOCs in soils and surface water at the site. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 3.4.4 and 3.4.5.

The suspected sources of contaminants detected during sampling conducted at the Vehicle Storage Area is unknown, but is possibly related to previous vehicle storage activities at the site. It is possible that the previously detected levels of DRO were from small isolated areas caused by leaks and/or spills in the vehicles stored at the site.

3.4.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

3.4.3.1 Topography and Stratigraphy. The Vehicle Storage Area (SS09) site consists of buildings (new construction) placed upon a gravel pad, above-ground storage tanks (temporary), a road, tundra, and ponded areas (Figure 3-4). The topography in this area is relatively flat, with the greatest relief provided by gravel pads and roads. The surrounding tundra is marshy with numerous ponds. The topography indicates that drainage from the site is generally to the west, although there are no distinct drainage features.

During the 1993 RI, the active layer at the site was approximately two feet thick in tundra areas and four feet thick under gravel pads. Gravel pad materials at this site were of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Wainwright (Section 2.4.4.2).

3.4.3.2 Migration Potential.

Subsurface Migration. The lack of drainage features in this area indicates that drainage from the site is in the subsurface. Because analytical data indicate that there is a general lack of significant contamination at the site, the potential for contaminant migration in active layer water from the site is considered to be low.

Surface Migration. The only time that surface drainage could be expected to occur from the site is in the spring, when abundant meltwater and a lack of infiltration could result in overland flow. Because there is a general lack of significant contamination in surface water or sediments, the potential for contaminant migration in surface water is considered to be minimal.

Air Transport. Air transport is not considered to be a significant mode of migration at the site (Section 2.4.4.5).

Summary of Migration Potential. Most drainage from the site is expected to occur in the subsurface. Because there is a general lack of significant contamination in surface water or sediments, the potential for contaminant migration from the site is considered to be low.

3.4.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Vehicle Storage Area site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soils/sediments at the site. The primary routes of potential exposures at the site are direct contact with, and incidental ingestion of, soils/sediment and ingestion of surface water. Because groundwater and air at the Wainwright sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Wainwright Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children who may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with site chemicals at Wainwright are presented in Section 3.4.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Wainwright Risk Assessment (U.S. Air Force 1996) to determine if chemicals detected at the Wainwright installation could potentially have an impact upon plants and animals. Because of the diversity of the plants and animals in the area of the installation, a set of representative species was selected for detailed evaluation in the ERA. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on the species' likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Wainwright. The potential ecological risks associated with the chemicals detected at the site are presented in Section 3.4.4.

3.4.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Vehicle Storage Area (SS09) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

3.4.4.1 Chemicals of Concern. No COC was identified for the soil/sediment matrix at the Vehicle Storage Area site based on a comparison of the maximum concentrations of the detected chemicals to their background, RBSL, and ARAR concentrations.

Barium, manganese, vanadium, zinc, and 1,2-dichloroethane were identified as COCs for the surface water at the site. The maximum concentrations of barium, manganese, vanadium, and zinc exceeded the noncarcinogen RBSLs for contamination of surface water. The maximum concentration of 1,2-dichloroethane exceeded the carcinogen RBSL for contamination of surface water but was below the ARAR concentration.

Table 3-6, Identification of COCs at the Vehicle Storage Area, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies the COCs selected in the risk evaluation.

3.4.4.2 Potential Receptors and Exposure Pathways. Because no COC was identified in the soil/sediment matrix at the Vehicle Storage Area, only ingestion of surface water was evaluated in the human health risk assessment.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

3.4.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. No COC was identified for the soil at the Vehicle Storage Area (SS09) site. This does not indicate that exposure to chemicals in the soil at the site is without health risk; however, the concentrations measured were lower than the concentrations considered acceptable under Region 10 guidance (EPA 1991a) or federal ARARs.

Noncancer Hazard and Cancer Risk Associated with Surface Water. The noncancer hazard associated with the ingestion of surface water at the Vehicle Storage Area by a hypothetical native northern adult is 11.1, and by a DEW Line worker is 0.867, based on the maximum concentrations of the COCs. The presence of barium, manganese, vanadium, and zinc accounts for the quantifiable noncancer hazard for these receptor/pathway combinations.

The excess lifetime cancer risk associated with the ingestion of surface water at the Vehicle Storage Area by a hypothetical native northern adult is 2×10^{-6}, and by a DEW Line worker is 2×10^{-8}, based on the maximum concentration of the COC. The presence of 1,2-dichloroethane

accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

3.4.4.4 Summary of Human Health Risk Assessment. The potential risks and hazards associated with the surface water at the Vehicle Storage Area are the noncancer hazard (hazard indices of 11.1 and 0.867) associated with the manganese, vanadium, and zinc, and the low cancer risks (2×10^{-6} and 2×10^{-8}) associated with 1,2-dichloroethane in surface water at the site.

The potential noncancer hazards and the cancer risks were calculated based on a conservative future scenario assuming the affected surface water would be used as a sole-source water supply for 180 days per year. Based on site-specific information these chemicals in surface water do not currently pose a health hazard nor are they likely to pose a hazard in the future. The surface water expressions at the site are frozen most of the year; many are only intermittently filled with water during the summer months. The surface water at the site is not used for a water supply now, nor has it been used in the past. In addition, the calculations assumed the concentrations of the COCs would not change for 55 years and were homogenous throughout the water supply; therefore, the hazards and risks are likely to be overestimated by at least an order of magnitude. In conclusion, the COCs identified in surface water at the Vehicle Storage Area site pose only a minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site. In the unlikely event that surface water at the site is used as a sole-source of drinking water in the future, a potential noncancer hazard to human health could exist if current conditions remain constant.

3.4.5 Ecological Risk Assessment

The objective of the ERA is to estimate the potential impacts of chemicals detected at the installation on aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

3.4.5.1 Chemicals of Concern. COCs were selected based on criteria presented in Section 3.1 of the ERA. The average installation-wide concentrations of COCs were used to calculate the risk estimate. All sites at the installation were considered as potentially usable habitat because the installation has been inactive since 1989. Of the chemicals detected in soils/sediments and surface water at the Vehicle Storage Area, tetrachloroethene, aluminum, iron, manganese, vanadium, and zinc were identified as COCs; however, the only COCs that contributed to potential ecological risks were iron in soil/sediment, and aluminum, iron, manganese, and zinc in surface water.

3.4.5.2 Potential Receptors and Exposure Pathways. The potential ecological receptors evaluated in the ERA include plants, aquatic organisms, birds, and mammals likely to occur along the Arctic Coastal Plain. Representative species from these receptor groups were selected based primarily on the species' likelihood of exposure, preferred habitat, and feeding habits. No threatened or endangered species are expected to be in potential exposure pathways at the Wainwright installation, thus none are evaluated in the ERA. The representative species are presented in Table 2-6.

Ecological receptors can be exposed to COCs through abiotic and biotic media. Potential exposure pathways for terrestrial and aquatic organisms include direct contact with, and ingestion of, contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water. They may also be exposed to COCs through ingestion of plant and animal items in the diet, and incidental ingestion of soil/sediment while foraging, although these pathways are considered less significant and are not used to calculate HQs. Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items, and incidental ingestion of soil/sediment.

3.4.5.3 Risk Characterization. At the Vehicle Storage Area the only COCs that pose potential hazards are iron in soil/sediment, and aluminum, iron, manganese, and zinc in surface water. The potential receptors affected by iron in soil/sediment include the Lapland longspur, brant, pectoral sandpiper, and brown lemming. The HQs for these species are 3, 4, 40, and 20, respectively. The potential receptors affected by aluminum, iron, manganese, and zinc in surface water are the nine-spined stickleback and *Daphnia* spp. The respective HQs for these species are as follows: aluminum, 22 and 20; iron, 28 for both species; manganese, 9.5 and 1.7; and zinc, 9.6 and 14.

3.4.5.4 Summary of Ecological Risk Assessment. The evaluation of potential adverse impacts to representative plant species indicates no apparent risks from COCs detected at the Vehicle Storage Area.

The risk estimates for aquatic organisms are developed under the assumption that fish species may potentially be exposed to COCs at the site. However, the elevated concentrations of COCs are from samples taken from seasonal drainages that freeze solid in winter. Consequentially, these areas provide little, if any, suitable habitat for fish. The risk to invertebrates, assessed using *Daphnia* spp., is low for aluminum because the dissolved concentrations of aluminum are non-detects (<100 µg/L), and the total concentrations used to develop the HQs probably overestimate the exposure to the receptors. The threat to invertebrates from iron, manganese, and zinc may be considered to be moderate at the specific sample locations where these COCs are elevated, although the risk over the entire Vehicle Storage Area and Wainwright installation may be characterized as low.

Iron is an essential element that is regulated by animals, although it is not known how much iron is actually required in a species diet. As a result, the iron concentrations at the Vehicle Storage Area site may not produce a toxic response. In addition, there is a great deal of uncertainty regarding the uptake of iron by plants and the subsequent bioavailability of iron in the herbivorous portion of the species' diets, so the ERA may overestimate hazard to the representative species from iron. In view of these factors and the low to moderate magnitude of the iron HQs, the threat to avian and mammalian receptors attributable to iron at the Vehicle Storage Area is considered to be minimal.

3.4.6 Conclusions and Recommendations

Sampling and analyses have determined that there is no significant contamination at the Vehicle Storage Area (SS09). Only very low levels of contaminants were detected. The source, although unknown, is possibly isolated spills or leaks caused by previous vehicle storage activities at the site. Migration of contaminants from the site appears minimal based on samples collected in drainage pathways leading from the site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Potential hazards and risks were identified in surface water from barium, manganese, vadium, zinc, and 1,2-dichloroethane. The potential hazards and risks are based on a future scenario in which the site surface water would be used as a sole-source drinking water supply and are probably overestimated by at least an order of magnitude.

Based on the RI sampling and analyses and the risk assessment, remedial actions are not warranted at the site. No significant human health or ecological risk was identified at the site. Therefore, the Vehicle Storage Area (SS09) site is recommended for no further action.

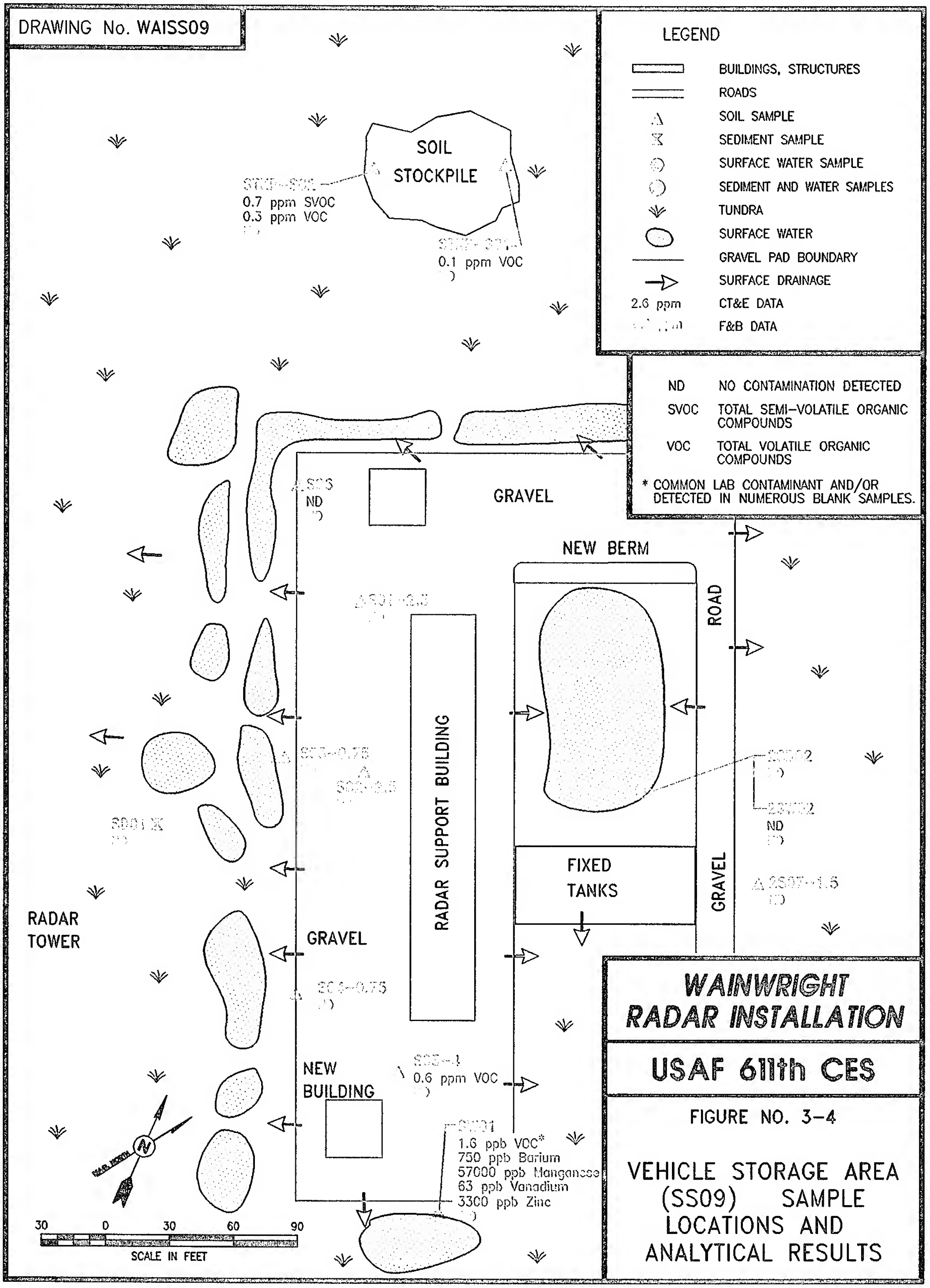
DRAWING No. WAISS09
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SEDIMENT SAMPLE
SURFACE WATER SAMPLE
SEDIMENT AND WATER SAMPLES
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm
CT&E DATA
F&B DATA
ND
NO CONTAMINATION DETECTED
SVOC
TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
VOC
TOTAL VOLATILE ORGANIC COMPOUNDS
* COMMON LAB CONTAMINANT AND/OR DETECTED IN NUMEROUS BLANK SAMPLES.
SOIL STOCKPILE
0.7 ppm SVOC
0.3 ppm VOC
0.1 ppm VOC
GRAVEL
ND
NEW BERM
ROAD
RADAR SUPPORT BUILDING
FIXED TANKS
ND
GRAVEL
RADAR TOWER
GRAVEL
NEW BUILDING
0.6 ppm VOC
1.6 ppb VOC*
750 ppb Barium
57000 ppb Manganese
63 ppb Vanadium
3300 ppb Zinc
N
30
0
30
60
90
SCALE IN FEET
WAINWRIGHT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 3-4
VEHICLE STORAGE AREA (SS09) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY

Installation: Wainwright Matrix: Soil/Sediment
Site: Vehicle Storage Area (SS09) Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S01-2.5	S02-2.5	S03-4	S04-0.75	S05-0.75	S06	SD01	AB01	EB02	TB02		
Laboratory Sample ID Numbers					1492	1494	1498 4483-4	1502	1504	1506 4483-8	1490	1424	1498/1500	1422 4482-6	#5-9193 #1&2-9293 4482	#5-9193 #3&4-9493 #3&4-9293 4483
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-33	50-330	500[a]	<50[b]-<300J[b]	<70[b]	<80[b]	<160[b]	<140[b]	<330[b]	<50[b]	<70[b]	NA	<1,000[b]	NA	<1,000J	<200
GRPH	0.2-2	2-20	100	<2J[b]-<5J[b]	<2J[b]	<20J[b]	<20J[b]	<2J[b]	<2J[b]	<2J[b]	<2J[b]	<50J[b]	<50J[b]	<50J[b]	<50J	<2J-<20J
RRPH (Approx.)	11-67	110-670	2,000[a]	<100-<600	<140	<160	<320	<280	<670	<110	<130	NA	<2,000	NA	<2,000	<2,000
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	<1.0J	<1.0	<1.0J	<1.0J	<1.0J	<1.0J	<1.0J					
Benzene	0.02	0.2	0.5	<0.02-<0.1	<0.2J	<0.2	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2J
Toluene	0.02	0.2		<0.02-<0.1	<0.2J	<0.2	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2J
Ethylbenzene	0.02	0.2		<0.02-<0.1	<0.2J	<0.2	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2J
Xylenes (Total)	0.04	0.4		<0.04-<0.2	<0.4J	<0.4	<0.4J	<0.4J	<0.4J	<0.4J	<0.4J	<2	<2	<2	<2	<0.04-<0.4J
HVOC 8010	0.002	0.02		<0.02-<0.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<1	<1	<1	NA	<0.02
VOC 8260																
Tetrachloroethene	0.020	0.050-0.100		<0.020-<0.400	NA	NA	0.330	NA	NA	<0.100	NA	NA	NA	<1	<1	<0.020
Toluene	0.020	0.050-0.100		<0.020-<0.400	NA	NA	0.172	NA	NA	<0.100	NA	NA	NA	<1	<1	<0.020
Trichloroethane	0.020	0.050-0.100		<0.020-<0.400	NA	NA	0.062	NA	NA	<0.100	NA	NA	NA	<1	<1	<0.020
PCBs	0.01-0.07	0.1-0.7	10	<0.1-<2.8J	<0.1	<0.1	<0.3	<0.3	<0.7	<0.1	<0.1	NA	<2	NA	<2	<2

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Vehicle Storage Area (SS09)[c]
Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples				Field Blanks			Lab Blanks	
					2S07-1.5	2SD02	STKP-S01	STKP-S02	AB01	2EB03	2TB03		
Laboratory Sample ID Numbers					1898	1884	1900 4695-4	1902 4695-5	1424	1894/1896 4695-3	1886 4694-9	#6-9993 #1&2-9793 #1&2-9293 4695/4694	#6-91093 #1&2-91093 4695
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mgkg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-10	50-100	500[a]	<50[b]-<300J[b]	<100J[b]	<50J[b]	<60J[b]	<60J[b]	NA	<1,000J[b]	NA	<1,000	<50
GRPH	0.1-0.2	1-2	100	<2J[b]-<5J[b]	<2J[b]	<1J[b]	<1J[b]	<1J[b]	<50J[b]	<50J[b]	<50J[b]	<2J-<50J	<1J
RRPH (Approx.)	12-20	120-200	2,000[a]	<100-<600	<200	<120	<140	<140	NA	<2,000	NA	<2,000	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	<0.20	<0.10	<0.10	<0.10					
Benzene	0.002-0.004	0.02-0.04	0.5	<0.02-<0.1	<0.04	<0.02	<0.02	<0.02	<1	<1	<1	<1-<5	<0.02
Toluene	0.002-0.004	0.02-0.04		<0.02-<0.1	<0.04	<0.02	<0.02	<0.02	<1	<1	<1	<1	<0.02
Ethylbenzene	0.002-0.004	0.02-0.04		<0.02-<0.1	<0.04	<0.02	<0.02	<0.02	<1	<1	<1	<1	<0.02
Xylenes (Total)	0.004-0.008	0.04-0.08		<0.04-<0.2	<0.08	<0.04	<0.04	<0.04	<2	<2	<2	<2	<0.04
HVOC 8010	0.01-0.02	0.1-0.2		<0.02-<0.5	<0.2J	<0.1J	<0.1J	<0.1J	<1	<5	<5	<1J-<10J	<0.02J
VOC 8260													
Naphthalene	0.020	0.020-0.025		<0.020-<0.400	NA	NA	0.053J	0.072	NA	<1	<1	<1	<0.020
Toluene	0.020	0.020-0.025		<0.020-<0.400	NA	NA	<0.025J	0.027	NA	<1	<1	<1	<0.020
1,2,4-Trimethylbenzene	0.020	0.020-0.025		<0.020-<0.400	NA	NA	0.028J	0.042	NA	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040-0.050		<0.040-<0.800	NA	NA	0.031J	0.125	NA	<2	<2	<2	<0.040
SVOC 8270													
Benzyl alcohol	0.200	0.220-0.230		<0.200-32.0	NA	NA	<0.230	0.694	NA	<21	NA	<10	<0.200
TOC				10,500-44,100	NA	NA	9,880	6,780	NA	NA	NA	NA	NA

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.
c Stockpiled soils (STKP) located in the vicinity of the Vehicle Storage Area were sampled in conjunction with this site.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Vehicle Storage Area (SS09)[c]
Matrix: Soil
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples				Field Blanks		Lab Blanks
					S03-4	S06	STKP-S01	STKP-S02	EB02	2EB03	
Laboratory Sample ID Numbers					4483-4	4483-8	4695-4	4695-5	4483-9	4695-3	4695 4483
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L
Aluminum	0.35	2		1,500-25,000	1,450	1,200	2,800	2,800	<100	<100	<100
Antimony	N/A	37-52		<7.8-<230	<37	<51J	<47	<52	<100	<100	<100
Arsenic	0.11	5.1-52		<4.9-8.5	<37	<5.1	<47	<52	<100	<100	<100
Barium	0.024	1		27-390	170	59J	100	160	<50	<50	<50
Beryllium	N/A	2.5-26		<2.6-6.4	<18	<2.5	<23	<26	<50	<50	<50
Cadmium	0.33	2.5-18		<3.0-<36	<18	<2.5	<2.3	<2.6	<50	<50	<50
Calcium	0.69	4		360-59,000	1,500	1,700	3,800	3,100J	<200	<200	<200
Chromium	0.066	1		<4.3-47	7.6	5.3	8.4	11	<50	<50	<50
Cobalt	N/A	1-5.2		<5.1-12	3.8	<5.1	<4.7	<5.2	<100	<100	<100
Copper	0.045	1		<2.7-45	4.8	9.4	5.9	8.0	<50	<50	<50
Iron	0.50	2		5,400-35,000	24,400	12,300	17,000	16,000	<100	<100	<100
Lead	0.13	4.7-36		<5.1-22	<36	<5.1	<4.7	<5.2	<100	<100	<100
Magnesium	0.96	4		360-7,400	800	1,060J	1,800	1,700	<200	<200	<200
Manganese	0.025	1		25-290	230	150J	168	150	<50	<50	<50
Molybdenum	N/A	1.8-2.6		<2.5-<11	<1.8	<2.5	<2.3	<2.6	<50	<50	<50
Nickel	0.11	1		4.2-46	11	5.5	10	10	<50	<50	<50

☐ CT&E Data.
N/A Not available.
J Result is an estimate.
c Stockpiled soils (STKP) located in the vicinity of the Vehicle Storage Area were sampled in conjunction with this site.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Vehicle Storage Area (SS09)[c]
Matrix: Soil
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples				Field Blanks		Lab Blanks
					S03-4	S06	STKP-S01	STKP-S02	EB02	2EB03	
Laboratory Sample ID Numbers					4483-4	4483-8	4695-4	4695-5	4483-9	4695-3	4695 4483
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L
Potassium	23	100		<300-2,200	230	430J	610	690J	<5,000	<5,000	<5,000
Selenium	1.2	36-52		<7.8-<170	<36	<51	<47	<52	<100	<100	<100
Silver	0.53	18-26		<3-<110	<18	<25R	<23	<26J	<50	<50	<50
Sodium	0.55	5		<160-680	170	52	140	290J	<250	<250	<250
Thallium	0.011	0.18-0.25		<0.2-<1.2	<0.18	<0.24	<0.25	<0.24	<5	<5	<5
Vanadium	0.036	1		6.3-59	15	9.0	16	17	<50	<50	<50
Zinc	0.16	1		9.2-95	23	32	22	22	<50	<50	<50

☐ CT&E Data.
J Result is an estimate.
R Result has been rejected.
c Stockpiled soils (STKP) located in the vicinity of the Vehicle Storage Area were sampled in conjunction with this site.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright Matrix: Surface Water
Site: Vehicle Storage Area (SS09) Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples		Field Blanks					Lab Blanks
					SW01	2SW02	AB01	EB02	TB02	2EB03	2TB03	
Laboratory Sample ID Numbers					1444/1446 4483-10	1880/1882 4694-5	1424	1498/1500 4483-9	1422 4482-6	1894/1896 4695-3	1886 4694-9	#6-9993 #5-9493 #5-9193 #1&2-9793 #1&2-9293 4695/4694 4483/4482
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DRPH	100	1,000		<1,000J[b]	<1,000[b]	<1,000J[b]	NA	<1,000[b]	NA	<1,000J[b]	NA	<200-<1,000J
GRPH	5	50		<50J[b]-<100J[b]	<50J[b]	<50J[b]	<50[b]	<50J[b]	<50J[b]	<50J[b]	<50J[b]	<2J-<50J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000	NA	<2,000	NA	<2,000	NA	<2,000
BTEX (8020/8020 Mod.)												
Benzene	0.1	1	5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	0.1	1	1,000	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	0.1	1	700	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes (Total)	0.2	2	10,000	<2	<2	<2	<2	<2	<2	<2	<2	<2
HVOC 8010	0.5-1	5-10		<5-<10	<1	<5	<1	<1	<1	<5	<5	<1J-<10J
VOC 8260												
1,2-Dichloroethane	1	1	5	<1	1.6	<1	NA	NA	<1	<1	<1	<1
SVOC 8270	10	10-11		<10-<13	<10	<11[c]	NA	NA	NA	<21	NA	<10

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.
c The laborabory reported that a possible error occurred during extraction process associated with this sample which resulted in no recoveries for phenolic surrogate and spike compounds.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright Matrix: Surface Water
Site: Vehicle Storage Area (SS09) Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples		Field Blanks					Lab Blanks
					SW01	2SW02	AB01	EB02	TB02	2EB03	2TB03	
Laboratory Sample ID Numbers					1444/1446 4483-10	1880/1882 4694-5	1424	1498/1500 4483-9	1422 4482-6	1894/1896 4695-3	1886 4694-9	#6-9993 #5-9493 #5-9193 4695/4483
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Pesticides	0.001-2.5	0.01-25		<0.2J-<25J	<0.01-<0.2	<0.2J-<25J	NA	<0.2J-<25J	NA	<0.2J-<25J	NA	<0.2J-<10J
PCBs	0.2	2	0.5	<2J	<2J	<2J	NA	<2	NA	<2J	NA	<2J
TOC	5,000	5,000		7,480	107,000	NA	NA	5,000	NA	<5,000	NA	<5,000
TSS	100	200		7,000-35,000	750,000	15,000	NA	NA	NA	NA	NA	<100
TDS	10,000	10,000		91,000-151,000	587,000J	425,000J	NA	NA	NA	NA	NA	<10,000

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Vehicle Storage Area (SS09)
Matrix: Surface Water
Units: µg/L
METALS ANALYSES: TOTAL (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blanks		Lab Blanks
					SW01	SW02					EB02	2EB03	
Laboratory Sample ID Numbers					4483-10	4694-5					4483-9	4695-3	4483 4694 4695
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					µg/L	µg/L	µg/L
Aluminum	17.4	100		<100-350 (<100-340)	9,700 (<100)	<100 (<100)					<100	<100	<100
Antimony	N/A	100	6	<100 (<100)	<100 (<100)	<100 (<100)					<100	<100	<100
Arsenic	5.3	100	50	<100 (<100)	<100 (<100)	<100 (<100)					<100	<100	<100
Barium	1.2	50	2,000	<50-93 (<50-91)	750 (220)	200 (140)					<50	<50	<50
Beryllium	N/A	50	4	<50 (<50)	<50 (<50)	<50 (<50)					<50	<50	<50
Cadmium	1.7	50	5	<50 (<50)	<50 (<50)	<50 (<50)					<50	<50	<50
Calcium	34.5	200		4,500-88,000 (4,100-86,000)	71,000 (57,000)	40,000 (40,000)					<200	<200	<200
Chromium	3.29	50	100	<50 (<50)	<50 (<50)	<50 (<50)					<50	<50	<50
Cobalt	N/A	100		<100 (<100)	<100 (<100)	<100 (<100)					<100	<100	<100
Copper	2.3	50	1,300	<50 (<50)	<50 (<50)	<50 (<50)					<50	<50	<50
Iron	25	100		180-2,800 <100-1,600)	130,000 (17,000)	12,000 (250)					<100	<100	<100
Lead	6.6	100	15	<100 (<100)	<100 (<100)	<100 (<100)					<100	<100	<100

☐ CT&E Data.
N/A Not analyzed.

TABLE 3-5. VEHICLE STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Vehicle Storage Area (SS09)
Matrix: Surface Water
Units: µg/L
METALS ANALYSES: TOTAL (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blanks		Lab Blanks
					SW01	SW02					EB02	2EB03	
Laboratory Sample ID Numbers					4483-10	4694-5					4483-9	4695-3	4483 4694 4695
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					µg/L	µg/L	µg/L
Magnesium	47.8	200		<5,000-53,000 (2,600-54,000)	57,000 (48,000)	49,000 (48,000)					<200	<200	<200
Manganese	1.24	50		<50-510 (<50-120)	3,800 (3,000)	130 (70)					<50	<50	<50
Molybdenum	N/A	50-100		<50 (<50)	<50 (<50)	<100R (<50R)					<50	<50	<50
Nickel	5.5	50	100	<50 (<50)	51 (<50)	<50 (<50)					<50	<50	<50
Potassium	1,154	5,000		<5,000 (<5,000)	<5,000 (<5,000)	<5,000 (<5,000)					<5,000	<5,000	<5,000
Selenium	62.4	100	50	<100 (<100)	<100 (<100)	<100 (<100)					<100	<100	<100
Silver	2.6	50	50	<50 (<50)	<50 (<50)	<50 (<50)					<50	<50	<50
Sodium	27.7	250		8,400-410,000 (8,200-450,000)	27,000 (27,000)	45,000 (45,000)					<250	370	<250
Thallium	0.57	5	2	<5 (<5)	<5 (<5)	<5 (<5)					<5	<5	<5
Vanadium	1.8	50		<50 (<50)	63 (<50)	<50 (<50)					<50	<50	<50
Zinc	8.2	50		<50-160 (<50)	3,300 (390)	<50 (<50)					<50	<50	<50

☐ CT&E Data.
N/A Not analyzed.
R Result has been rejected.

TABLE 3-6. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE VEHICLE STORAGE AREA (SS09)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b]		ARAR[c]	CHEMICAL OF CONCERN[d]
						CANCER	NON-CANCER		
Vehicle Storage Area (SS09)	Soil/Sediment	Naphthalene	0.072	mg/kg	<0.020-<32.0	--	1,100	--	No
		Benzyl alcohol	0.694	mg/kg	<0.20-<32.0	--	8,100	--	No
		Tetrachloroethene	0.330	mg/kg	<0.020-<0.400	1.23	270	--	No
		Toluene	0.172	mg/kg	<0.020-<0.400	--	5,400	--	No
		Trichloroethene	0.062	mg/kg	<0.020-<0.400	5.8	--	--	No
		1,2,4-Trimethylbenzene	0.042	mg/kg	<0.020-<0.400	--	--	--	**Yes***
		Xylenes	0.125	mg/kg	<0.040-<0.800	--	54,000	--	No
		Aluminum	2,800	mg/kg	1,500-25,000	--	--	--	No
		Barium	170	mg/kg	27-390	--	1,890	--	No
		Calcium	3,800	mg/kg	360-59,000	--	--	--	No
		Chromium	11	mg/kg	<4.3-47	--	135	--	No
		Cobalt	3.8	mg/kg	<5.1-12	--	--	--	No
		Copper	9.4	mg/kg	<2.7-45	--	999	--	No
		Iron	24,400	mg/kg	5,400-35,000	--	--	--	No
		Magnesium	1,800	mg/kg	360-7,400	--	--	--	No
		Manganese	230	mg/kg	25-290	--	3,780	--	No
		Nickel	11	mg/kg	4.2-46	--	540	--	No

* Chemicals without an RBSL or ARAR are considered chemical of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).
J Result is an estimate.
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are considered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e MCL, 52 FR 25690 (08 Jul 1989).
f MCL, 56 FR 30266 (01 Jul 1991).
g MCL, 57 FR 31776 (17 Jul 1992).

TABLE 3-6. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE VEHICLE STORAGE AREA (SS09) (CONTINUED)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b]		ARAR[c]	CHEMICAL OF CONCERN[d]
						CANCER	NON-CANCER		
Vehicle Storage Area	Soil/Sediment	Potassium	690J	mg/kg	<300-2,200	--	--	--	No
(SS09)	(Continued)	Sodium	290J	mg/kg	<160-680	--	--	--	No
(Continued)		Vanadium	17	mg/kg	6.3-59	--	189	--	No
		Zinc	32	mg/kg	9.2-95	--	8,100	--	No
	Surface Water	1,2-Dichloroethane	1.6	µg/L	<1	0.934	--	5[e]	Yes
		Aluminum	9,700	µg/L	<100-350	--	--	--	Yes*
		Barium	750	µg/L	<50-93	--	256	2,000[f]	Yes
		Calcium	71,000	µg/L	4,500-88,000	--	--	--	No
		Iron	130,000	µg/L	180-2,800	--	--	--	No
		Magnesium	57,000	µg/L	<5,000-53,000	--	--	--	No
		Manganese	3,800	µg/L	<50-510	--	18.3	--	Yes
		Nickel	51	µg/L	<50	--	73	100[g]	No
		Sodium	45,000	µg/L	8,400-410,000	--	--	--	No
		Vanadium	63	µg/L	<50	--	25.6	--	Yes
		Zinc	3,300	µg/L	<50-160	--	1,100	--	Yes

* Chemicals without an RBSL or ARAR are considered chemical of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).
J Result is an estimate.
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are considered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e MCL, 52 FR 25690 (08 Jul 1989).
f MCL, 56 FR 30266 (01 Jul 1991).
g MCL, 57 FR 31776 (17 Jul 1992).

4.0 REMEDIAL INVESTIGATION - REMEDIAL ACTION SITES

This section of the RI/FS presents results from RI sampling and analysis activities for each of the two Wainwright sites where remedial action may be warranted. The two sites considered for remedial action and discussed in this section are the Diesel Fuel Spills (SS04) and the Garage (SS07). Each of the sites is presented individually in Sections 4.1 and 4.2. (Note: figures and tables are presented at the end of each section.) The information presented for each site includes site background, field sampling and analytical results, potential migration pathways, human health and ecological risk assessment summaries, and conclusions and recommendations. The site-by-site discussions in this section are intended to provide the reader with all site information needed to understand the site conditions and make decisions regarding appropriate action for each of the sites.

Photographs of the Wainwright installation and the sites investigated during the RI are presented in Appendix B. Data tables presented in this section list analytical results from samples in which chemicals were detected above quantitation limits. Complete laboratory analytical data sheets for each sample, including quantitation limits for non-detected analytes, are presented in Appendix F.

4.1 DIESEL FUEL SPILLS (SS04)

4.1.1 Site Background

The Diesel Fuel Spills (SS04) site consists of soil/sediment and a gravel pad located below and adjacent to the west end of the module train. Two 10,000-gallon fuel spills were reported at the powerhouse section of the module train in the 1970s. Approximately 4,000 gallons from the second spill were recovered and used. The spills have been estimated to extend from the midpoint of the module train to the western edge of the gravel pad. Smaller spills may have resulted from transfers of diesel oil from bulk fuel storage to the module train day tanks.

Previous sampling, conducted in 1992 by Air Force contractors, detected toluene in surface water at the Diesel Fuel Spills site. The source area and concentration previously detected are presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 4.1.3.

4.1.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Diesel Fuel Spills (SS04) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

4.1.2.1 Summary of Samples Collected. A total of 14 samples was collected from gravel pads, tundra, ponds, and streams at the site. These consisted of seven soil, four sediment, and three surface water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Diesel Fuel Spills (SS04) site are presented in Figure 4-1.

Seven soil samples were analyzed for DRPH and RRPH. In addition, six samples were analyzed for GRPH. Five samples were analyzed for BTEX and PCBs. Two samples were analyzed for pesticides, and one sample was analyzed for VOCs and SVOCs.

Four sediment samples were analyzed for DRPH, GRPH, RRPH, and BTEX. In addition, one sample was analyzed for VOCs.

Three surface water samples were analyzed for DRPH, GRPH, RRPH, and BTEX. In addition, one sample was analyzed for VOCs, SVOCs, TOC, TSS, and TDS.

4.1.2.2 Analytical Results. The data summary table (Table 4-1) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds with samples collected from the site. Sample locations and analytical results for the samples at the site are illustrated in Figure 4-1. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. The exceptions are presented on the data summary table.

Following are discussions of organic compounds detected above background levels at the site. A discussion of TDS, TSS, and TOC is included.

Organics. Organic compounds detected in soil and sediment samples collected at the site include DRPH, GRPH, BTEX compounds, and four other VOCs. DRPH were detected in two soil samples at 4,900 and 2,200 mg/kg (SS04-S01/S05 and SS04-2S08-1, respectively). GRPH were detected in four samples at concentrations ranging from 6 to 120 mg/kg. Two BTEX compounds, ethylbenzene and xylenes, were detected at 7 and 17 mg/kg, respectively, in replicate soil sample SS04-S01/S05. Four other VOCs that are common components of diesel were detected in the same sample at concentrations ranging from 0.237 to 14.4 mg/kg; 1,3,5-trimethylbenzene was the primary VOC detected.

No organic compound was detected in surface water samples collected at the site.

Inorganics. Metals were not a concern at the site, and no metals analyses were performed.

In surface water samples, TOC was reported at 32,500 and 30,000 μg/L in duplicate samples SS04-SW01 and SS04-SW04, respectively. TSS were reported at 28,000 and 13,000 μg/L, and TDS were reported at 459,000 and 465,000 μg/L in the same respective samples.

4.1.2.3 Summary of Site Contamination. Previous sampling conducted at the Diesel Fuel Spills (SS04) detected toluene in surface water at 130 μg/L. The results and the sources of previous sampling efforts are presented in the RI/FS Work Plan (U.S. Air Force 1993a). The quality of the previous IRP sampling data is unknown as is the data validation, if any, that these data have undergone.

Current soil/sediment analytical results detected DRPH, GRPH, ethylbenzene, xylenes, and four other VOCs that are common constituents of diesel. No organic compounds were detected in surface water samples collected at this site.

A comparison of historical and current project data indicates that the level of toluene in surface water at the Diesel Fuel Spills site has decreased. However, petroleum compounds were detected in soil and sediment during the 1993 RI. The chemicals detected at the Diesel Fuel Spills site are suspected to be a result of fuel spills from the day tanks inside the module train (vent/overflow pipe discharge outside module train). Differences between past and current data are likely to be attributable to more extensive sampling during the 1993 RI. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 4.1.4 and 4.1.5.

Based on field data, source of contamination, and concentration of the contaminants, significantly contaminated soil and sediment appear to be limited to approximately 156 cubic yards below the west end of the module train. Low levels of petroleum compounds (GRPH) were detected in sediment from the tundra to the northwest of the module train indicating that minimal migration of contaminants has occurred.

4.1.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

4.1.3.1 Topography and Stratigraphy. The Diesel Fuel Spills site is located near the west end of the module train (Figure 4-1). The site consists of the module train, gravel pads, roads, tundra, and ponds.

The topography in this area slopes slightly to the southwest, indicating that drainage is towards Wainwright Inlet. Areas under the module train are drained by culverts to either the west or southwest; water that drains to the west enters a ponded area with no apparent outlet, while water draining to the southwest enters a ponded area drained by a small stream.

During the 1993 RI, the active layer at the site was approximately two feet thick in tundra areas and four feet thick under gravel pads. Gravel pad material consisted of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Wainwright (Section 2.4.4.2).

4.1.3.2 Migration Potential.

Subsurface Migration. Soil samples collected along the northwest portion of the module train contained DRPH and GRPH. A ponded area located just to the west of these samples should receive active layer water that flows through this portion of the site; surface water and sediment samples collected from this ponded area indicated a general lack of contamination (although a small amount of GRPH was detected in one sediment sample). This suggests that active layer water has not functioned as a significant migration pathway, and that the potential for offsite migration of contaminated active layer water is minimal.

Surface Migration. The site topography indicates that surface water should drain generally to the west, primarily through a small stream that drains a ponded area adjacent to the gravel pad. Surface water and sediment samples from the small stream, the two ponded areas, and the marshy tundra exhibit a general lack of contaminants, suggesting that surface water at the site is not contaminated. The potential for surface migration from the site is, therefore, considered to be minimal.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.5).

Summary of Migration Potential. Although analytical data suggest that a localized area of soil along the northwest edge of the module train is contaminated with petroleum hydrocarbons, surface water and sediment samples suggest that significant contaminant migration from this area is not occurring in either surface or subsurface water. Based upon the analytical data, the potential for contaminant migration from this area is considered to be low.

4.1.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Diesel Fuel Spills site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soil/sediments at the site. The primary routes of potential exposures at the site are incidental ingestion of soil/sediment and ingestion of surface water. Because groundwater and air at the Wainwright sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Wainwright Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children who may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with chemicals detected at the site are presented in Section 4.1.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Wainwright Risk Assessment (U.S. Air Force 1996) to determine if plants and animals could potentially be impacted by the chemicals detected at the Wainwright installation. Because of the diversity of the plants and animals in the area of the Wainwright installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on the species' likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Wainwright. The potential ecological risks associated with the chemicals detected at the site are presented in Section 4.1.5.

4.1.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Diesel Fuel Spills (SS04) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

4.1.4.1 Chemicals of Concern. At the Diesel Fuel Spills (SS04) site, COCs identified in the soil/sediment matrix are DRPH and GRPH. DRPH and GRPH were selected because concentrations detected exceeded the ARARs.

No COCs were identified for surface water at the Diesel Fuel Spills site based on a comparison of the maximum concentrations of the detected chemicals to their background, RBSL, and ARAR concentrations.

Table 4-2, Identification of COCs at the Diesel Fuel Spills, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

4.1.4.2 Exposure Pathways and Potential Receptors. Because no COC was identified in surface water at the site, only ingestion of soil/sediment was evaluated in the risk assessment.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

4.1.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil at the Diesel Fuel Spills site by a hypothetical native northern adult/child is 0.075, and by a DEW Line worker is 0.002, based on the maximum concentrations of the COCs. The presence of DRPH and GRPH accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations.

The excess lifetime cancer risk associated with the ingestion of soil at the Diesel Fuel Spills site by a hypothetical native northern adult/child is 4×10^{-8}, and by a DEW Line worker is 8×10^{-10}, based on the maximum concentrations of the COCs. The presence of GRPH accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

Noncancer Hazard and Cancer Risk Associated with Surface Water. No COC was identified for the surface water at the Diesel Fuel Spills site. This does not indicate that exposure to the chemicals in the surface water at the site is without health risk; however, the concentrations measured were lower than the concentrations considered acceptable under Region 10 guidance (EPA 1991a) or federal ARARs.

4.1.4.4 Summary of Human Health Risk Assessment. The potential risks and hazards associated with the soil/sediment at the Diesel Fuel Spills site are the very low noncancer hazards (hazard indices of 0.075 and 0.002), and very low cancer risk associated with GRPH. The noncancer hazards and cancer risks are below the threshold levels at which remediation is recommended (noncancer hazards are below one and cancer risks are less than 1×10^{-6}) (EPA 1991b). In addition, the hazards and risks were calculated conservatively based on a future residential scenario. Therefore, the noncancer and cancer risks associated with soil/sediment at the site are minimal.

In conclusion, under current or future site uses, the COCs identified in soil/sediment at the Diesel Fuel Spills site pose only a minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site.

4.1.5 Ecological Risk Assessment

The objective of the ERA is to estimate the potential impacts of chemicals detected at the Wainwright installation to aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

4.1.5.1 Chemicals of Concern. COCs for the ERA were selected based on the criteria presented in Section 3.1 of the ERA. The average installation-wide concentrations of COCs were used to calculate the risk estimates. All sites at the installation were considered potentially usable habitat because the installation has been inactive since 1989. Of the chemicals detected

in soil/sediments and surface water at the Diesel Fuel Spills site, DRPH, GRPH, RRPH, ethylbenzene, xylene, naphthalene, and trimethylbenzene (the 1,2,4- and 1,3,5-siomers were evaluated together) were identified as COCs; however, none of the COCs contributed to potential ecological risks at this site or any other site at the Wainwright installation.

4.1.5.2 Exposure Pathways and Potential Receptors. Potential exposure pathways for terrestrial and aquatic organisms include ingestion of contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water. They may also be exposed to COCs through ingestion of plant and animal items in the diet, and incidental ingestion of soil/sediment while foraging, although these pathways are considered less significant and are not used to calculate HQs. Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items, and incidental ingestion of soil/sediment.

The potential ecological receptors evaluated in the ERA include plants, aquatic organisms, birds, and mammals likely to occur along the Arctic Coastal Plain. Representative species from these receptor groups were selected based primarily on the species' likelihood of exposure, preferred habitat and feeding habits. No threatened or endangered species are expected to be in potential exposure pathways at the Wainwright installation, thus none are evaluated in the ERA. The representative species are presented in Table 2-6.

4.1.5.3 Risk Characterization. No HQ values are elevated for any of the COCs detected at the Diesel Fuel Spills site.

4.1.5.4 Summary of Ecological Risk Assessment. Potential risks to ecological receptors at the Diesel Fuel Spills site are estimated to be low based on the evaluation of the representative species.

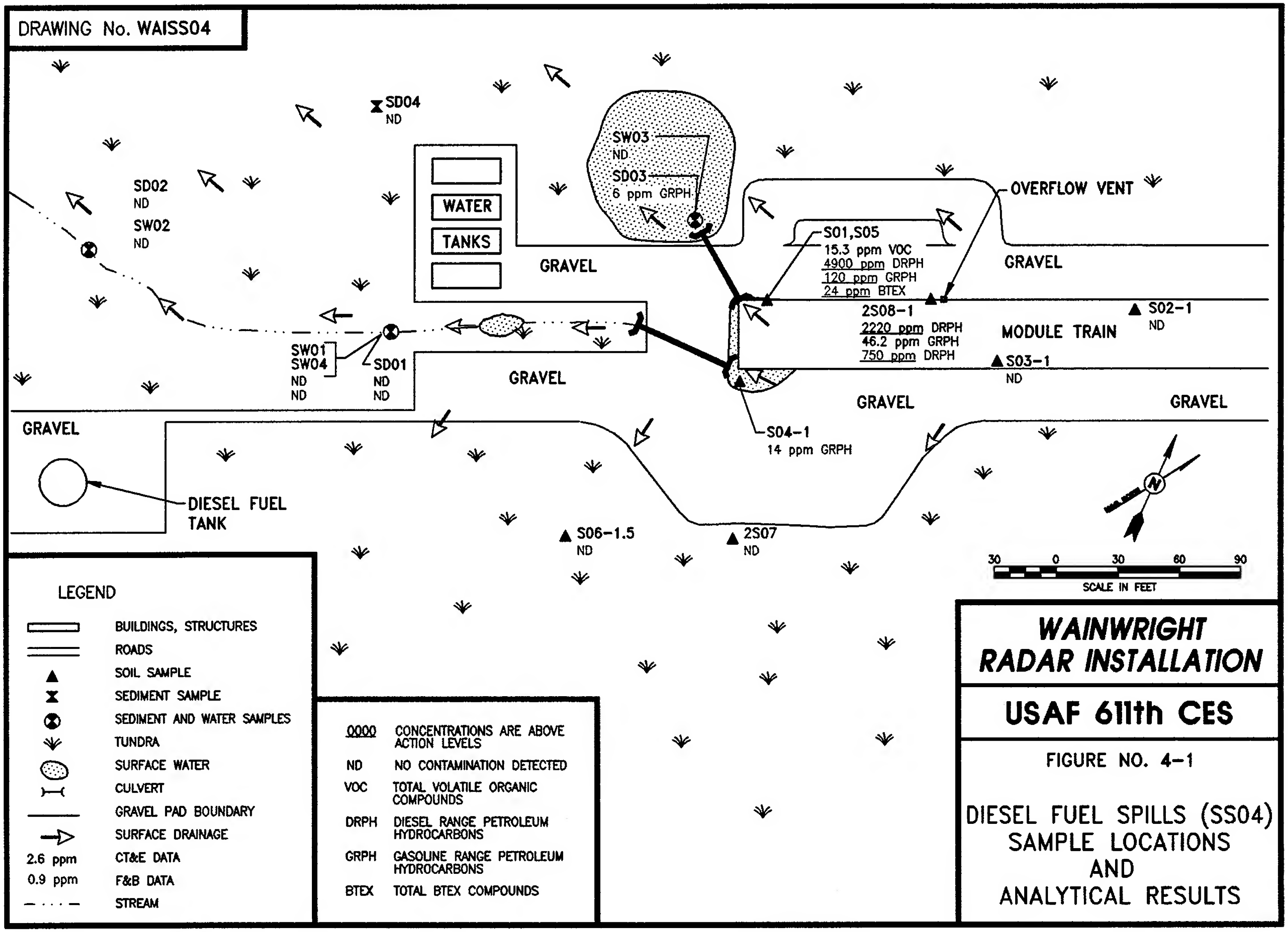
4.1.6 Conclusions and Recommendations

Sampling and analyses have determined that the Diesel Fuel Spills (SS04) site is contaminated primarily with petroleum hydrocarbons. The contaminated areas at the site are soil/sediment and surface water beneath the west end of the module train. The likely sources of contamination are the two reported diesel spills (overfilling) at the day tanks inside the module train.

Migration of contaminants from the site appears to have occurred to a limited degree through a culvert that leads from below the module train to the tundra area to the north. Very low levels of GRPH were detected in a soil/sediment sample from this tundra area.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. Even with the very conservative approach used in the risk assessment, the risk posed by the site is not of a magnitude that normally requires remedial action. Therefore, under current or future site conditions and considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel) detected at the site, however, significantly exceed ADEC guidance cleanup levels; therefore, the site is recommended for remedial action. Passive bioremediation is the recommended alternative for remediation of the area below the module train. A complete description and evaluation of the remedial alternatives considered for this site and the rational for the selected alternatives are presented in the Feasibility Study, Section 5.0.



DRAWING No. WAISS04
SD04
ND
SD02
ND
SW02
ND
WATER
TANKS
GRAVEL
SW03
ND
SD03
6 ppm GRPH
OVERFLOW VENT
S01,S05
15.3 ppm VOC
4900 ppm DRPH
120 ppm GRPH
24 ppm BTEX
2S08-1
2220 ppm DRPH
46.2 ppm GRPH
750 ppm DRPH
MODULE TRAIN
S02-1
ND
S03-1
ND
SW01
SW04
ND
ND
SD01
ND
ND
GRAVEL
GRAVEL
GRAVEL
GRAVEL
GRAVEL
S04-1
14 ppm GRPH
DIESEL FUEL
TANK
S06-1.5
ND
2S07
ND
30 0 30 60 90
SCALE IN FEET
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SEDIMENT SAMPLE
SEDIMENT AND WATER SAMPLES
TUNDRA
SURFACE WATER
CULVERT
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
STREAM
0000 CONCENTRATIONS ARE ABOVE ACTION LEVELS
ND NO CONTAMINATION DETECTED
VOC TOTAL VOLATILE ORGANIC COMPOUNDS
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH GASOLINE RANGE PETROLEUM HYDROCARBONS
BTEX TOTAL BTEX COMPOUNDS
WAINWRIGHT
RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 4-1
DIESEL FUEL SPILLS (SS04)
SAMPLE LOCATIONS
AND
ANALYTICAL RESULTS

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TABLE 4-1. DIESEL FUEL SPILLS ANALYTICAL DATA SUMMARY

Installation: Wainwright Matrix: Soil
Site: Diesel Fuel Spills (SS04) Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples: S01 & S05 (Replicates)		Environmental Samples: S02-1	Environmental Samples: S03-1	Environmental Samples: S04-1	Environmental Samples: S06-1.5	Field Blanks: AB01	Field Blanks: EB02	Field Blanks: TB02	Lab Blanks	
Laboratory Sample ID Numbers					1478 4483-2	1486 4483-3	1480	1482	1484	1488	1424	1498/1500 4483-9	1422 4482-6	#5-9193 #1&2-9293	#5-9193 #3&4-9293
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-10	50-100	500[a]	<50[b]-<300J[b]	4,600J[b]	4,900J[b]	<50[b]	<50[b]	<100[b]	<70[b]	NA	<1,000[b]	NA	<1,000J	<200
GRPH	0.2	2	100	<2J[b]-<5J[b]	120NJ[b]	120NJ[b]	<2J[b]	<2J[b]	14NJ[b]	<2J[b]	<50J[b]	<50J[b]	<50J[b]	<50J	<1J-<20
RRPH (Approx.)	10-15	100-150	2,000[a]	<100-<600	<110	<110	<110	<100	<150	<140	NA	<2,000	NA	<2,000	<2,000
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	23J	24J	<1.0J	<1.0J	<1.0J	<1.0J					
Benzene	0.02	0.2	0.5	<0.02-<0.1	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Toluene	0.02	0.2		<0.02-<0.1	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Ethylbenzene	0.02	0.2		<0.02-<0.1	6NJ	7NJ	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Xylenes (Total)	0.04	0.4		<0.04-<0.2	17NJ	17NJ	<0.4J	<0.4J	<0.4J	<0.4J	<2	<2	<2	<2	<0.04-<0.4
VOC 8260															
p-Isopropyl-toluene	0.020	0.200		<0.020-<0.400	0.237	<0.2	NA	NA	NA	NA	NA	NA	<1	<1	<0.020
Naphthalene	0.020	0.200		<0.020-<0.400	0.613	0.851	NA	NA	NA	NA	NA	NA	<1	<1	<0.020
1,2,4-Trimethyl-benzene	0.020	0.200		<0.020-<0.400	0.382	0.849	NA	NA	NA	NA	NA	NA	<1	<1	<0.020
1,3,5-Trimethyl-benzene	0.020	0.200		<0.020-<0.400	5.49	14.4	NA	NA	NA	NA	NA	NA	<1	<1	<0.020
SVOC 8270	0.200	2.20		<0.200-83.4J	NA	<2.20	NA	NA	NA	NA	NA	NA	NA	NA	<0.200
Pesticides	0.001-0.05	0.01-0.5		<0.01J-<2.8J	NA	NA	<0.01J-<0.5J	NA	<0.01J-<0.5J	NA	NA	<0.02J-<10J	NA	NA	<0.01J-<0.5J
PCBs	0.01-0.04	0.1-0.4	10	<0.1-<2.8J	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	NA	<2	NA	<2	<2

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 4-1. DIESEL FUEL SPILLS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Diesel Fuel Spills (SS04)
Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples				Field Blanks			Lab Blanks	
					SD01-1	SD02-1	SD03	SD04-1	AB01	EB02	TB02		
Laboratory Sample ID Numbers					1440 4483-1	1434	1436	1438	1424	1498/1500 4483-9	1422 4482-6	#5-9193 #1&2-9293 4482/4483	#6-91093 #3&4-9493 4483
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-33	50-330	500[a]	<50[b]-<300J[b]	<240[b]	<330[b]	<100[b]	<50[b]	NA	<200[b]	NA	<1,000J	<50
GRPH	0.2	2	100	<2J[b]-<5J[b]	<2J[b]	<2J[b]	6NJ[b]	<2J[b]	<50J[b]	<50[b]	<50J[b]	<50J	<1-<20
RRPH (Approx.)	11-67	110-670	2,000[a]	<100-<600	<480	<670	<200	<110	NA	<2,000	NA	<2,000	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.1-<0.5	<1.0J	<1.0J	<1.0J	<1.0J					
Benzene	0.02	0.2	0.5	<0.02-<0.1	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Toluene	0.02	0.2		<0.02-<0.1	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Ethylbenzene	0.02	0.2		<0.02-<0.1	<0.2J	<0.2J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Xylenes (Total)	0.04	0.4		<0.04-<0.2	<0.4J	<0.4J	<0.4J	<0.4J	<2	<2	<2	<2	<0.04-<0.4
VOC 8260	0.020	0.075		<0.020-<0.400	<0.075	NA	NA	NA	NA	NA	<1	<1	<0.020

□ CT&E Data.
▒ F&B Data.
NA Not analyzed.
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 4-1. DIESEL FUEL SPILLS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright Matrix: Soil
Site: Diesel Fuel Spills (SS04) Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples		Field Blanks			Lab Blanks	
					2S07	2S08-1	AB01	2EB03	2TB03		
Laboratory Sample ID Numbers					1877	1878 4695-1	1424	1894/1896	1886	#6-9993 #1&2-9793 #1&2-9293	#6-91093 #1&2-91093 4695
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00-6	4.00-60	500[a]	<50[b]-<300[b]	<60J[b]	2,220[c]	NA	<1,000J[b]	NA	<1,000	<4.00-<50
GRPH	0.400	0.400	100	<2J[b]<5J[b]	NA	46.2	<50J[b]	<50J[b]	<50J[b]	<2J-<50J	<0.400
RRPH (Approx.)	14-16	140-160	2,000[a]	<100-<600	<140	<160	NA	<2,000	NA	<2,000	<100

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.
c This sample was analyzed by F&B also; DRPH were detected at 750J[b] mg/kg.

TABLE 4-1. DIESEL FUEL SPILLS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Diesel Fuel Spill (SS04)
Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples: SW01 & SW04 (Duplicates)		Environmental Samples: SW02	Environmental Samples: SW03	Field Blanks: AB01	Field Blanks: EB02	Field Blanks: TB02	Lab Blanks
Laboratory Sample ID Numbers					1406/1408 4482-1	1417/1418 4482-5	1426/1428	1430/1432	1424	1498/1500 4483-9	1422 4482-6	4482 4483 #5-9193 #1&2-9293
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DRPH	100	1,000		<1,000J[b]	<1,000[b]	<1,000[b]	<1,000[b]	<1,000[b]	NA	<200[b]	NA	<1,000J
GRPH	5	50		<50J[b]-<100J[b]	<50J[b]	<50R[b]	<50J[b]	<50J[b]	<50J[b]	<50J[b]	<50J[b]	<50J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000	<2,000	<2,000	NA	<2,000	NA	<2,000
BTEX (8020/8020 Mod.)												
Benzene	0.1	1	5	<1	<1	<1R	<1	<1	<1	<1	<1	<1
Toluene	0.1	1	1,000	<1	<1	<1R	<1	<1	<1	<1	<1	<1
Ethylbenzene	0.1	1	700	<1	<1	<1R	<1	<1	<1	<1	<1	<1
Xylenes (Total)	0.2	2	10,000	<2	<2	<2R	<2	<2	<2	<2	<2	<2
HVOC	0.1	1		<5-<10	<1	NA	NA	NA	<1	<1	<1	<1
VOC 8260	1	1		<1	<1	<1	NA	NA	NA	NA	<1	<1
SVOC 8270	10	10		<10-<13	<10	<10	NA	NA	NA	NA	NA	<10
TOC	5,000	5,000		7,480	32,500	30,000	NA	NA	NA	<5,000	NA	<5,000
TSS	100	200		7,000-35,000	28,000	13,000	NA	NA	NA	NA	NA	<100
TDS	10,000	10,000		91,000-151,000	459,000	465,000	NA	NA	NA	NA	NA	<10,000

☐ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
R Result has been rejected.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 4-2. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE DIESEL FUEL SPILLS (SS04)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN[c]
						CANCER	NON-CANCER		
Diesel Fuel Spills (SS04)	Soil/Sediment	DRPH	4,900J	mg/kg	<50-<300J	--	--	500[d]	**Yes**
		GRPH	120NJ	mg/kg	<2J-<5J	--	--	100[d]	**Yes**
		Ethylbenzene	7NJ	mg/kg	<0.020-<0.400	--	2,700	--	No
		p-Isopropyltoluene	0.237	mg/kg	<0.020-<0.400	--	5,400	--	No
		Naphthalene	0.851	mg/kg	<0.020-<32.0	--	1,100	--	No
		1,2,4-Trimethylbenzene	14.4	mg/kg	<0.020-<0.400	--	--	--	**Yes***
		1,3,5-Trimethylbenzene	5.49	mg/kg	<0.020-<0.400	--	--	--	**Yes***
		Xylenes	17NJ	mg/kg	<0.040-<0.200	--	54,000	--	No

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a Risk-Based Screening Level.
b Applicable or Relevant and Appropriate Requirement.
c The COCs selected for each site do not include metals that are considered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
d Target cleanup levels for DRPH, GRPH, and RRPH in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.

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4.2 GARAGE (SS07)

4.2.1 Site Background

The Garage (SS07) site is located north of the module train and west of the warehouse. The Garage building is approximately 80 feet by 40 feet and was used for vehicle maintenance and storage. The building is raised approximately four feet above the tundra and is bounded by a four foot gravel pad on all sides. Floor drains in this building previously discharged directly to the tundra; however, the site has been inactive since 1989. Culverts lead from under the Garage to the tundra to the west and to a large ponded area surrounded by a gravel berm to the east.

Previous sampling, conducted in 1989 and 1992 by Air Force contractors, detected diesel, BTEX compounds, and metals in the soil/sediment matrix. A detailed list of source areas, contaminants, and concentrations previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 4.2.3.

4.2.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Garage (SS07) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

4.2.2.1 Summary of Samples Collected. A total of 13 samples was collected from gravel pads, tundra, ponds, and streams at the site. These consisted of two soil, six sediment, and five surface water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Garage (SS07) site are presented in Figure 4-2.

Two soil samples were analyzed for DRPH, GRPH, RRPH, BTEX, HVOCs, and PCBs. In addition, one sample was analyzed for VOCs, pesticides, and total metals.

Six sediment samples were analyzed for DRPH and RRPH. In addition, five samples were analyzed for GRPH. Four samples were analyzed for BTEX, HVOCs, and PCBs. Two samples were analyzed for pesticides, and one sample was analyzed for VOCs and total metals.

Five surface water samples were analyzed for DRPH and RRPH. In addition, three samples were analyzed for GRPH. Two samples were analyzed for VOCs, SVOCs, pesticides, and total and dissolved metals.

4.2.2.2 Analytical Results. The data summary table (Table 4-3) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring

organic compounds and inorganic analytes with samples collected from the site. Sample locations and analytical results for the samples at the site are illustrated in Figure 4-2. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or decontamination procedures. In addition, metals detected above background levels that exceed an RBSL or ARAR are presented on Figure 4-2. In addition, The exceptions are presented on the data summary table.

Following are discussions of organic compounds and inorganic analytes detected above background levels at the site.

Organics. Organic compounds detected in soil and sediment samples at the site include DRPH, GRPH, RRPH, BTEX compounds, and five other VOCs. DRPH were detected in four samples ranging from 47.4 to 120,000 mg/kg. GRPH were detected in two soil samples at 120 and 8 mg/kg (samples SS07-S01/S03 and SS07-S02, respectively). RRPH were detected in three samples ranging from 530 to 77,000 mg/kg (samples SS07-S01/S03, SS07-S02, and SS07-2SD05). BTEX compounds (ethylbenzene and xylenes) were detected in three samples. Total BTEX concentrations ranged from 0.6 to 19 mg/kg; xylenes were the primary component. Five other VOCs were detected at concentrations ranging from 0.024 to 11.5 mg/kg; tetrachloroethene was the primary VOC (11.5 mg/kg).

In surface water samples, one VOC (1,2-dichloroethene) and one SVOC (bis(2-ethylhexyl)phthalate) were detected at low concentrations. The detection of 1,2-dichloroethene may be the result of field decontamination procedures; the hexane and methanol used in the decontamination procedures may have contained impurities including 1,2-dichloroethene. Bis(2-ethylhexyl)phthalate, a common laboratory contaminant, is likely the result of laboratory cross-contamination.

Inorganics. Metals analyses indicated that four metals (iron, lead, manganese, and zinc) were detected at concentrations above background levels in soil/sediment samples at the site.

In surface water samples, five metals (barium, calcium, iron, manganese, and zinc) were detected above background concentrations.

4.2.2.3 Summary of Site Contamination. The primary contaminants at the site are petroleum compounds (DRPH, GRPH, RRPH) and VOCs that are common components of fuel. The source of contaminants detected during sampling conducted at the Garage (SS07) site is suspected to be POL wastes discharged to the building floor drains. The Garage has been inactive since the installation closure in 1989.

Contaminants previously detected at the site include petroleum compounds, BTEX, and metals in the soil/sediment matrix. During the sampling conducted in 1989, TPH was detected at 15,000 and 26,000 mg/kg; arsenic, barium, chromium, and lead were detected at maximum concentrations of 20 mg/kg, 140 mg/kg, 14 mg/kg, and 370 mg/kg, respectively. During the sampling conducted in 1992, diesel range organics were detected in four samples at concentrations ranging from 132 to 708 mg/kg; low levels of ethylbenzene and xylene were also detected (0.1 to 1.7 mg/kg).

During the current RI investigation, petroleum compounds were detected at higher concentrations (120,000 mg/kg DRPH and 77,000 mg/kg RRPH) in one sediment sample and at similar concentrations (8 mg/kg GRPH to 830 mg/kg DRPH) in other soil/sediment samples. BTEX and several other VOCs that are common components of fuel were also detected at low concentrations. Lead was detected above background levels in two soil/sediment samples at 74 and 130 mg/kg. Five metals, including aluminum and chromium, were detected above background concentrations in surface water samples collected at the site.

A comparison of historical and current project data indicates similar concentrations of petroleum compounds in the soil/sediment at the site. Differences between past and current data are likely to be a result of more extensive sampling during the 1993 RI. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 4.2.4 and 4.2.5.

Contaminants exceeding action levels were detected in soil/sediment samples at the Garage (SS07) site. Based on field data, source of contamination, and concentration of the contaminants, significantly contaminated soil appears to be limited to 3,000 square feet below the structure. Some of the contaminants have been carried by surface runoff to tundra areas west of the Garage.

4.2.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

4.2.3.1 Topography and Stratigraphy. The Garage (SS07) site consists of the garage building, the surrounding gravel pad, roads, ponds, streams, and tundra (Figure 4-2). The topography in this area is relatively flat, and most of the relief is from gravel pads and roads.

Ponded areas are located immediately northeast, northwest, and west of the gravel pad that surrounds the Garage. The area under the Garage drains to both the northeastern and the western ponds via culverts placed under the gravel pad. The northeastern pond is bermed on all sides by gravel pads and roads; this pond drains to both the northwestern pond and to yet another small pond located to the east via culverts placed under the surrounding roads. Two small streams drain the western pond. These streams infiltrate into the tundra a short distance from the site. There are no obvious outlets from the northwestern pond.

During the 1993 RI, the active layer at the site was approximately two feet thick in tundra areas and four feet thick under gravel pads. Gravel pad materials at this site were of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Wainwright (Section 2.4.4.2).

4.2.3.2 Migration Potential.

Subsurface Migration. Analytical results indicate that some contamination of sediments has occurred at the site. This is most prominent in the northern stream that drains from the western

pond; a sediment sample from this feature contained 197,000 mg/kg petroleum hydrocarbons (DRPH and RRPH). Field team members noted a strong odor of petroleum from sediment along the length of this stream. Because this stream infiltrates into the subsurface and disappears a short distance from the site, any contaminated surface water present in the stream will potentially enter the tundra and active layer (although there was a general lack of contaminants detected in surface water samples collected during the RI). The local topography indicates that drainage in the active layer is towards the southwest. The potential for offsite migration of contaminated active layer water from this site cannot be dismissed, but significant attenuation and dilution should occur before active layer water from this site could migrate any appreciable distance.

Surface Migration. There was a general lack of contaminants detected in surface water samples. Samples from the western ponded area contained only minor quantities of organic contaminants, even though contamination was detected in sediments from its outlet stream; the contaminants detected in surface water are likely to be due to laboratory contamination or field decontamination procedures. Regardless of the source, the potential for offsite migration of contaminants in surface water is restricted, because streams that drain the site extend only a short distance before they infiltrate into the tundra soils and active layer. The potential for contaminant migration in surface water is present only during the spring, when abundant quantities of meltwater and reduced infiltration may result in overland flow from the site.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.5).

Summary of Migration Potential. Analytical data indicate that migration of contaminants has occurred at this site. Both surface and subsurface migration are potential contaminant migration pathways from the site. Because streams draining the site infiltrate into the subsurface, any contaminated surface water will potentially enter the active layer and migrate towards the southwest. The site is not expected to have a detectable impact upon water quality, because significant attenuation and dilution will occur before active layer water can migrate any appreciable distance. In addition, significant contamination was limited to site sediment samples and was not detected in surface water samples.

4.2.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Garage site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soil/sediments at the site. The primary routes of potential exposures at the site are incidental ingestion of soil/sediment and ingestion of surface water. Because groundwater and air at the Wainwright sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Wainwright Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the

installation, and native adults and children who may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with site chemicals at Wainwright are presented in Section 4.2.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Wainwright Risk Assessment (U.S. Air Force 1996) to determine if plants and animals could potentially be impacted by the chemicals detected at the Wainwright installation. Because of the diversity of the plants and animals in the area of the Wainwright installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on the species' likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Wainwright. The potential ecological risks associated with the chemicals detected at the site are presented in Section 4.2.5.

4.2.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Garage (SS07) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the contaminants detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

4.2.4.1 Chemicals of Concern. At the Garage (SS07), COCs identified for the soil/sediment matrix included DRPH, GRPH, RRPH, and tetrachloroethene. Bis(2-ethylhexyl)phthalate and 1,2-dichloroethane were identified as COCs in surface water at the site. DRPH, GRPH, and RRPH were selected as COCs because the maximum concentration detected exceeded the background concentration and ARARS. Tetrachloroethane was selected as a COC because the maximum concentration detected exceeded the carcinogen RBSL for contamination of soil. Bis(2-ethylhexyl)phthalate and 1,2-dichloroethane were selected because the maximum concentrations exceeded the carcinogenic RBSLs for contamination of surface water.

Table 4-4, Identification of COCs at the Garage (SS07), presents the maximum concentrations of chemicals detected at the site, associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

4.2.4.2 Exposure Pathways and Potential Receptors. Because COCs were identified for soil/sediment and surface water, ingestion of soil/sediment and ingestion of surface water were evaluated in the risk assessment at this site.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native) and a child living in a North Slope community (child).

4.2.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil at the Garage (SS07) by hypothetical native northern adult/child is 2.990, and by a DEW Line worker is 0.068, based on the maximum concentrations of the COCs. The presence of DRPH, GRPH, RRPH, and tetrachloroethene accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations. The excess lifetime cancer risk associated with the ingestion of soil at the site by a hypothetical native northern adult/child is 1×10^{-7}, and by a DEW Line worker is 3×10^{-9}, based on the maximum concentrations of the COCs. The presence of GRPH and tetrachloroethene accounts for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

Noncancer Hazard and Cancer Risk Associated with Surface Water. The noncancer hazard associated with the ingestion of surface water at the Garage site by a hypothetical native northern adult is 0.011, and by a DEW Line worker is <0.001, based on the maximum concentrations of the COCs. The presence of bis(2-ethylhexyl)phthalate accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations. The excess lifetime cancer risk associated with the ingestion of surface water at the site by a hypothetical native northern adult is 5×10^{-6}, and by a DEW Line worker is 6×10^{-8}, based on the maximum concentrations of the COCs. The presence of bis(2-ethylhexyl)phthalate and 1,2-dichloroethene accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

4.2.4.4 Summary of Human Health Risk Assessment. The potential risks and hazards associated with the soil/sediment at the Garage are the noncancer hazard (hazard indices of 2.990 and 0.068), and low cancer risk associated with the GRPH and tetrachloroethene. The low noncancer hazards and cancer risks were calculated conservatively based on a future residential scenario. It is very unlikely that the soil at this location would be ingested at the conservative rate used in the risk calculation, and the hazards and risks at the site are likely to be overestimated. Therefore, the cancer risks and noncancer hazards associated with soil/sediment at the site are minimal. In addition, remedial action is generally not warranted at sites where the excess lifetime cancer risk is less than 1×10^{-4} (EPA 1991b), and on the basis of carcinogenic risk alone, remediation of the site is not necessarily warranted.

The potential risks and hazards associated with the surface water at the Garage are the low hazard indices of 0.011 and <0.001, and the low cancer risks (6×10^{-8} and 5×10^{-6}) for both the adult worker and native, respectively. The noncancer hazard is associated with the level of bis(2-ethylhexyl)phthalate detected in surface water. The cancer risks are associated with bis(2-ethylhexyl)phthalate and 1,2-dichloroethane detected in surface water at the site. The noncancer hazards and cancer risks in surface water were calculated assuming the affected surface water would be used as a sole-source water supply for 180 days per year. Based on site-specific information, the above mentioned chemicals detected in surface water do not currently pose a health hazard nor are they likely to pose a hazard in the future. The surface water expressions at the site are frozen most of the year; many are only intermittently filled with water during the summer months. The surface water at the site is not known to be used as a water supply now, nor has it been used in the past. In addition, it is likely that the 1,2-dichloroethane detected was due to field decontamination procedures, and the bis(2-ethylhexyl)phthalate is likely to be a laboratory contaminant.

In conclusion, under current uses the COCs identified in soil/sediment and surface water at the Garage site pose only minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site.

4.2.5 Ecological Risk Assessment

The objective of the ERA is to estimate the potential impacts of chemicals detected at the installation to aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

4.2.5.1 Chemicals of Concern. COCs for the ERA were selected based on criteria presented in Section 3.1 of the ERA. The average installation-wide concentrations of COCs were used to calculate risk estimates. All sites at the installation were considered potentially usable habitat because the installation has been inactive since 1989. Of the chemicals detected in soils/sediments and surface water at the Garage site, DRPH, GRPH, RRPH, ethylbenzene, xylene, tetrachloroethene, napthalene, 1,2,4- and 1,3,5-trimethylbenzene, iron, lead, manganese, vanadium, and zinc were identified as COCs; however, the only COC identified at the site that contributed to potential risks to ecological receptors was iron in soil/sediment and surface water.

4.2.5.2 Exposure Pathways and Potential Receptors. Ecological receptors can be exposed to COCs through abiotic and biotic media. Potential exposure pathways for terrestrial and aquatic organisms include direct contact with, and ingestion of, contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water. Aquatic organisms may also be exposed to COCs through ingestion of plant and animal items in the diet, and incidental ingestion of soil/sediment while foraging; although these pathways are considered less significant and are not used to calculate HQs. Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items, and incidental ingestion of soil/sediment.

The potential ecological receptors evaluated in the ERA include plants, aquatic organisms, birds, and mammals likely to occur along the Arctic Coastal Plain. Representative species from these receptor groups were selected based primarily on the species' likelihood of exposure, preferred habitat, and feeding habits. No threatened or endangered species are expected to be in potential exposure pathways at the Wainwright installation, thus none are evaluated in the ERA. The representative species are presented in Table 2-6.

4.2.5.3 Risk Characterization. At the Garage, the representative species potentially affected by iron in soil/sediment are the brant, pectoral sandpiper, and brown leming with HQs of 1, 2, and 60, respectively. The representative species potentially affected by iron in surface water are the aquatic organisms: nine-spined stickleback and Daphnia spp. The HQs for iron were 28 for each aquatic organism.

4.2.5.4 Summary of Ecological Risk Assessment. The evaluation of potential adverse impacts to representative plant species indicates no apparent risk from COCs detected at the Garage site.

The elevated HQs for the aquatic species are misleading when evaluating the Garage site because the iron concentrations in surface water are above background concentrations at only one sample location (i.e., 2,900 µg/L iron in the sample versus a maximum 2,800 µg/L background iron concentration). Although the elevated HQ may indicate a potential hazard, it is not likely that the nine-spined stickleback (or any fish species) is found in the intermittent drainages where iron concentrations were detected. Iron is an essential human nutrient, and the uncertainties used in establishing the ratios may overestimate the toxicity of iron. As a result, the risk to aquatic species from iron is low.

Iron in soil/sediment at the Garage site contributes to the elevated HQs for the brant (HQ of 1), pectoral sandpiper (HQ of 2), and brown lemming (HQ of 60). There are uncertainties and factors that serve to mitigate the risk posed by iron. These factors include the uncertainty associated with the uptake of iron by plants and subsequent bioavailability of iron to herbivores; the "hot spot" nature of the contamination to which ecological receptors are unlikely to be exposed repeatedly; and the essential nutrient status of iron, which makes it difficult to determine what levels are actually toxic. Also, the highest iron concentration at the Garage site is in sediment and not likely to present a threat to the lemming, the species whose HQ (60) is highest for iron. These factors combine to result in an estimate of minimal potential hazard for the terrestrial receptors at the Garage site.

The ERA indicates that, although there are a few instances of potential hazard to individual species, overall the potential hazard presented by the chemicals detected at the site is low.

4.2.6 Conclusions and Recommendations

Sampling and analyses have determined that the Garage (SS07) site is contaminated with petroleum hydrocarbons (DRPH, GRPH, and RRPH), BTEX compounds, and other VOCs that are common components of fuel. Some metals (inorganics) detected at the site at slightly elevated levels are also considered to be COCs. The contaminated areas at the site are soil/sediment and

surface water. The soil/sediment areas beneath the site building have the highest concentrations of contaminants. The source of contamination is suspected to be POL wastes discharged to floor drains in the Garage.

Migration of contaminants from the site appears to have occurred via a stream and culverts that lead from beneath the Garage building to tundra areas. Contaminants detected in the sediment sample collected from the mouth of the west culvert leading from the Garage were similar to those detected below the Garage building; however, concentrations were lower. DRPH and RRPH were also detected in a drainage pathway downgradient of the west culvert indicating that contaminant migration has occurred.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current or future site uses. The human health risk assessment concluded that soil/sediment and surface water posed minimal, if any, threat to the human health. The ERA concluded that the overall potential hazard from site contaminants is low. Therefore, under current site conditions and considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel and residual range organics) detected in soil/sediment at the site, however, significantly exceed ADEC guidance cleanup levels. In addition, site contaminants have migrated downgradient of the site and have impacted soil/sediment and surface water. Therefore, the suspected source area at site, the area beneath the building, is being recommended for remedial action. The remedial action alternative recommended for beneath the building is passive bioremediation, pending a treatability study. A complete description and evaluation of the remedial alternative recommended for this site are presented in the Feasibility Study, Section 5.0.

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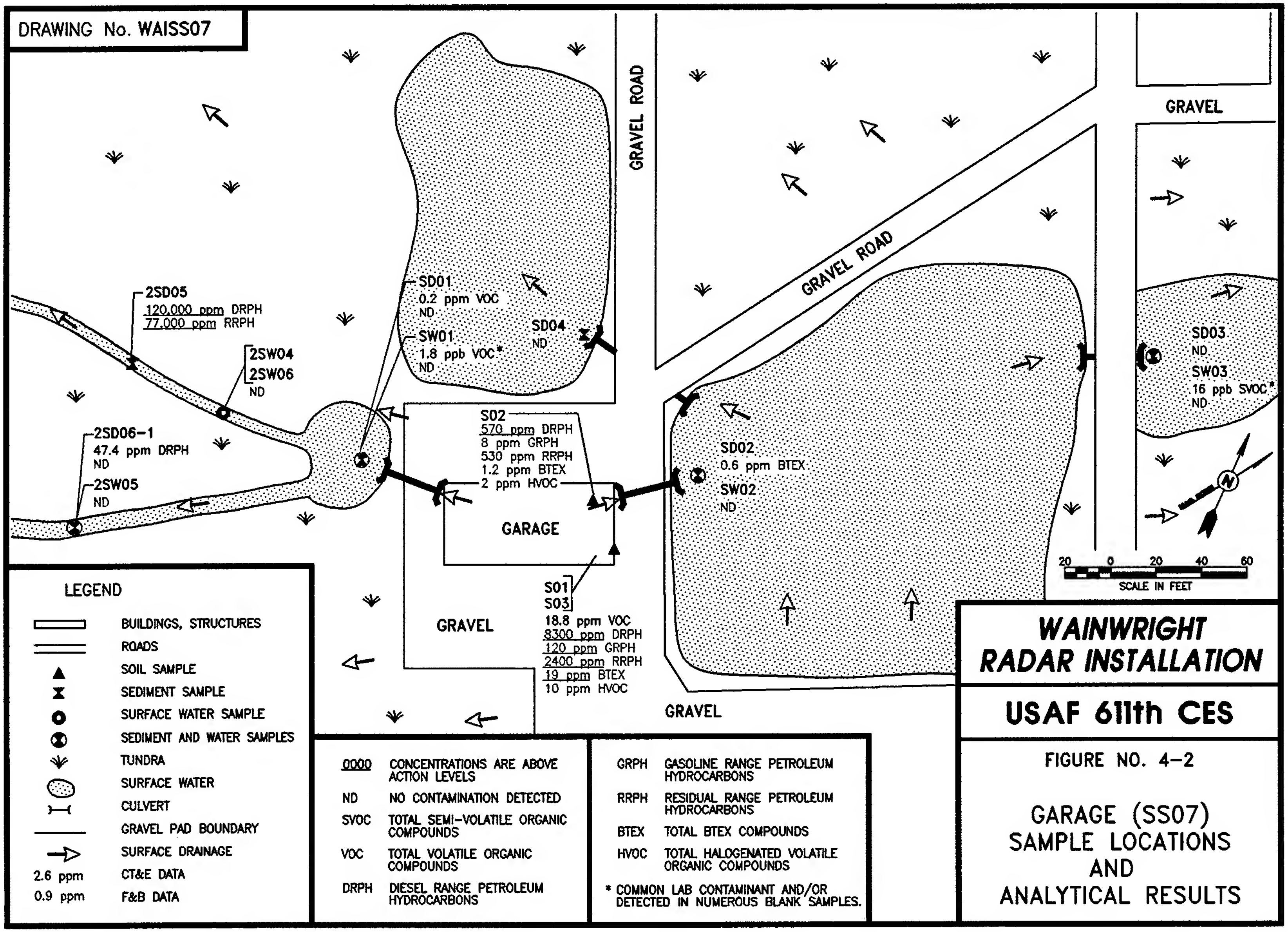
DRAWING No. WAISS07
GRAVEL ROAD
GRAVEL ROAD
GRAVEL
GRAVEL
GRAVEL
2SD05
120,000 ppm DRPH
77,000 ppm RRPH
2SW04
2SW06
ND
2SD06-1
47.4 ppm DRPH
ND
2SW05
ND
SD01
0.2 ppm VOC
ND
SW01
1.8 ppb VOC*
ND
SD04
ND
S02
570 ppm DRPH
8 ppm GRPH
530 ppm RRPH
1.2 ppm BTEX
2 ppm HVOC
GARAGE
S01
S03
18.8 ppm VOC
8300 ppm DRPH
120 ppm GRPH
2400 ppm RRPH
19 ppm BTEX
10 ppm HVOC
SD02
0.6 ppm BTEX
SW02
ND
SD03
ND
SW03
16 ppb SVOC*
ND
N
20 0 20 40 60
SCALE IN FEET
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SEDIMENT SAMPLE
SURFACE WATER SAMPLE
SEDIMENT AND WATER SAMPLES
TUNDRA
SURFACE WATER
CULVERT
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
0000 CONCENTRATIONS ARE ABOVE ACTION LEVELS
ND NO CONTAMINATION DETECTED
SVOC TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
VOC TOTAL VOLATILE ORGANIC COMPOUNDS
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH GASOLINE RANGE PETROLEUM HYDROCARBONS
RRPH RESIDUAL RANGE PETROLEUM HYDROCARBONS
BTEX TOTAL BTEX COMPOUNDS
HVOC TOTAL HALOGENATED VOLATILE ORGANIC COMPOUNDS
* COMMON LAB CONTAMINANT AND/OR DETECTED IN NUMEROUS BLANK SAMPLES.
WAINWRIGHT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 4-2
GARAGE (SS07)
SAMPLE LOCATIONS
AND
ANALYTICAL RESULTS

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TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY

Installation: Wainwright Matrix: Soil/Sediment
Site: Garage (SS07) Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S01 & S03 (Replicates)		S02	SD01	SD02	SD03	SD04	AB01	EB02	TB02		
Laboratory Sample ID Numbers					1458 4484-3	1462 4484-4	1460	1452 4484-5	1454	1456	1450	1424	1498 1500	1422 4482-6	#5-9193 #1&2-9293 4482	#5-9193 #3&4-9293 #3&4-9493 4484
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	5-7	50-70	500[a]	<50[b]-<300J[b]	6,500J[b]	8,300J[b]	570J[b]	<50[b]	<70[b]	<50[b]	<80[b]	NA	<1,000[b]	NA	<1,000J	<200
GRPH	0.2-2	2-20	100	<2J[b]-<5J[b]	120NJ[b]	59NJ[b]	8NJ[b]	<2J[b]	<2J[b]	<20J[b]	<2J[b]	<50J[b]	<50J[b]	<50J[b]	<50J	<1J-<20
RRPH (Approx.)	10-14	100-140	2,000[a]	<100-<600	1,200	2,400	530	<100	<140	<110	<120	NA	<2,000	NA	<2,000	<2,000
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.10-<0.5	19J	1.9J	1.2J	<1.0J	0.6J	<1.0J	<1.0J					
Benzene	0.002-0.02	0.02-0.2	0.5	<0.02-<0.1	<0.2J	<0.2	<0.2J	<0.2J	<0.02J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Toluene	0.002-0.02	0.02-0.2		<0.02-<0.1	<0.2J	<0.2	<0.2J	<0.2J	<0.02J	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Ethyl-benzene	0.002-0.02	0.02-0.2		<0.02-<0.1	4NJ	0.7NJ	<0.2J	<0.2J	0.1JN	<0.2J	<0.2J	<1	<1	<1	<1	<0.02-<0.2
Xylenes (Total)	0.004-0.04	0.04-0.4		<0.04-<0.2	15NJ	1.2NJ	1.2NJ	<0.4J	0.5JN	<0.4J	<0.4	<2	<2	<2	<2	<0.04-<0.4
HVOC 8010																
Tetrachloro-ethene	0.002	0.02		<0.02-<0.5	10	7	2	<0.02	<0.02	<0.02	<0.02	<1	<1	<1	<1	<0.02
VOC 8260																
p-Iso-propyl-toluene	0.020	0.020-0.200		<0.020-<0.400	0.394	0.502	NA	<0.020	NA	NA	NA	NA	NA	<1	<1	<0.020
Naph-thalene	0.020	0.020-0.200		<0.020-<0.400	<0.200	0.393	NA	0.034	NA	NA	NA	NA	NA	<1	<1	<0.020

□ CT&E Data.
▒ F&B Data.
NA Not analyzed.
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)

Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S01 & S03 (Replicates)		S02	SD01	SD02	SD03	SD04	AB01	EB02	TB02		
Laboratory Sample ID Numbers					1458 4484-3	1462 4484-4	1460	1452 4484-5	1454	1456	1450	1424	1498 1500	1422 4482-6	#5-9193 4482	#5-9193 4484
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
Tetra-chloro-ethene	0.020	0.020-0.200		<0.020-<0.400	10.4	11.5	NA	0.059	NA	NA	NA	NA	NA	<1	<1	<0.020
1,2,4-Tri-methyl-benzene	0.020	0.020-0.200		<0.020-<0.400	0.376	0.714	NA	0.040	NA	NA	NA	NA	NA	<1	<1	<0.020
1,3,5-Tri-methyl-benzene	0.020	0.020-0.200		<0.020-<0.400	1.75	5.36	NA	0.024	NA	NA	NA	NA	NA	<1	<1	<0.020
Xylenes (Total)	0.040	0.040-0.400		<0.040-<0.800	<0.400	0.354	NA	0.022	NA	NA	NA	NA	NA	<2	<2	<0.040
Pesticides	0.001-0.05	0.01-0.5		<0.01J-<2.8J	<0.01J-<0.5J	NA	NA	<0.01J-<0.5J	<0.01J-<0.5J	NA	NA	NA	<0.2J-<10J	NA	NA	<0.01-<0.5J
PCBs	0.01-0.20	0.1-2	10	<0.1-<2.8J	<2	<2J	<2	<0.1	<0.1	<0.1	<0.1	<2	<2	NA	<2	<2

□ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright Matrix: Sediment
Site: Garage (SS07) Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples				Field Blanks			Lab Blanks	
					2SD05	2SD06-1			AB01	2EB03	2TB03		
Laboratory Sample ID Numbers					1891	1892 4695-2			1424	1894/1896 4695-3	1886 4694-9	#6-9993 #1&2-9793 #1&2-9293	#6-91093 4695
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00-8	4.00-80	500[a]	<50[b]-<300J[b]	120,000J[b]	47.4[cd]			NA	<1,000J[b]	NA	<1,000	<4.00-<50
GRPH	0.400	0.600	100	<2J[b]-<5J[b]	NA	<0.600			<50J[b]	<50J[b]	<50J[b]	<2J-<50J	<0.400
RRPH (Approx.)	16	160	2,000[a]	<100-<600	77,000	<160			NA	<2,000	NA	<2,000	<100

□ CT&E Data.
▩ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.
c This sample was analyzed by F&B also; DRPH were detected at <80J[b] mg/kg.
d The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)

Matrix: Soil/Sediment
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blanks
					S01 & S03 (Replicates)		SD01					EB02		
Laboratory Sample ID Numbers					4484-3	4484-4	4484-5					4483-9		4483 4484
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					µg/L		µg/L
Aluminum	0.35	2-3,600		1,500-25,000	<3,600	2,800	1,980					<100		<100
Antimony	N/A	50-54		<7.8-<230	<53	<54	<50R					<100		<100
Arsenic	0.11	50-54		<4.9-8.5	<53	<54	<50					<100		<100
Barium	0.024	1		27-390	160	240	220					<50		<50
Beryllium	N/A	25-27		<2.6-6.4	<27	<27	<25					<50		<50
Cadmium	0.33	25-27		<3.0-<36	<27	<27	<25					<50		<50
Calcium	0.69	4		360-59,000	5,200	6,100	3,700					<200		<200
Chromium	0.066	1-27		<4.3-47	30	<27	<25					<50		<50
Cobalt	N/A	1-13.5		<5.1-12	8.6	<5.4	<13.5					<100		<100
Copper	0.045	1		<2.7-45	39	13	17					<50		<50
Iron	0.50	2		5,400-35,000	53,000	36,000	114,000					<100		<100
Lead	0.13	2-50		<5.1-22	130	74	<50					<100		<100
Magnesium	0.96	4		360-7,400	3,300	2,960	2,500					<200		<200
Manganese	0.025	1		25-290	660	370	1,250					<50		<50
Molybdenum	N/A	2.7-25		<2.5-<11	<2.7	<2.7	<25					<50		<50
Nickel	0.11	1		4.2-46	18	14	29					<50		<50
Potassium	23	100-270		<300-2,200	425	<270	290					<5,000		<5,000

☐ CT&E Data.
N/A Not available.
R Result has been rejected.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)

Matrix: Soil/Sediment
Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blanks
					S01 & S03 (Replicates)		SD01					EB02		
Laboratory Sample ID Numbers					4484-3	4484-4	4484-5					4483-9		4483 4484
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					µg/L		µg/L
Selenium	1.2	53-500		<7.8-<170	<53	<54	<500					<100		<100
Silver	0.53	25-27		<3-<110	<27	<27	<25R					<50J		<50
Sodium	0.55	5		<160-680	100	95	100					<250		<250
Thallium	0.011	0.26-0.27		<0.2-<1.2	<0.27	<0.27	<0.26					<5		<5
Vanadium	0.036	1		6.3-59	21	16	34					<50		<50
Zinc	0.16	1		9.2-95	240	89	160					<50		<50

☐ CT&E Data.
J Result is an estimate.
R Result has been rejected.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)

Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks
					SW01	SW02	SW03			AB01	EB02	TB02	
Laboratory Sample ID Numbers					1464/1466 4484-1	1468/1470	1474 4484-2			1424	1498/1500	1422 4482-6	#5-9193 #1&2-9293 4484/4482/4483
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			µg/L	µg/L	µg/L	µg/L
DRPH	100	1,000		<1,000J[a]	<1,000J[b]	<1,000[a]	<1,000[b]			NA	<1,000[b]	NA	<1,000J
GRPH	5	50		<50J[b]-<100J[a]	<50J[b]	<50J[a]	<50J[b]			<50J[a]	<50J[b]	<50J[b]	<2J-<50J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000	<2,000			NA	<2,000	NA	<2,000
BTEX (8020/ 8020 Mod.)													
Benzene	0.1	1	5	<1	<1	<1	<1			<1	<1	<1	<1
Toluene	0.1	1	1,000	<1	<1	<1	<1			<1	<1	<1	<1
Ethylbenzene	0.1	1	700	<1	<1	<1	<1			<1	<1	<1	<1
Xylenes (Total)	0.2	2	10,000	<2	<2	<2	<2			<2	<2	<2	<2
VOC 8260													
1,2-Dichloroethane	1	1	5	<1	1.8J	NA	<1			NA	NA	<1	<1
SVOC 8270													
bis-(2-Ethylhexyl) phthalate	10	10-11		<10-<13	<11	NA	16			NA	NA	NA	<10
Pesticides	0.02-1	0.2-10		<0.2J-<25J	<0.2J-<10J	<0.2J-<10J	NA			NA	<0.2J-<10J	NA	<0.01-<0.5J

□ CT&E Data.
▒ F&B Data.
NA Not analyzed.
J Result is an estimate.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)
Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blank			Lab Blanks
					2SW04 & 2SW06 (Replicates)		2SW05				2EB03		
Laboratory Sample ID Numbers					1888	1890	1889				1894 1896		#6-9993 #5-9193
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				µg/L		µg/L
DRPH	100	1,000		<1,000J[b]	<1,000[b]	<1,000[b]	<1,000[b]				<1,000J[b]		<1,000J
RRPH (Approx.)	200	2,000		<2,000	<2,000	<2,000	<2,000				<2,000		<2,000

☐ CT&E Data.
▩ F&B Data.
J Result is an estimate.
b DRPH concentrations reported for these samples are equivalent to diesel range organics (DRO) as defined by ADEC.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)

Matrix: Surface Water
Units: µg/L

METALS ANALYSES: TOTAL (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range for 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blanks
					SW01	SW03						EB02		
Laboratory Sample ID Numbers					4484-1	4484-2						4483-9		4483 4484
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L						µg/L		µg/L
Aluminum	17.4	100		<100-350 (<100-340)	<100 (<100)	<100 (<100)						<100		<100
Antimony	N/A	100	6	<100 (<100)	<100 (<100)	<100 (<100)						<100		<100
Arsenic	5.3	100	50	<100 (<100)	<100 (<100)	<100 (<100)						<100		<100
Barium	1.2	50	2,000	<50-93 (<50-91)	220 (180)	240 (200)						<50		<50
Beryllium	N/A	50	4	<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Cadmium	1.7	50	5	<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Calcium	34.5	200		4,500-8,800 (4,100-86,000)	30,000 (35,000)	37,000 (29,000)						<200		<200
Chromium	3.29	50	100	<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Cobalt	N/A	100		<100 (<100)	<100 (<100)	<100 (<100)						<100		<100
Copper	2.3	50	1,300	<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Iron	25	100		180-2,800 (<100-1,600)	2,900 (300)	1,100 (130)						<100		<100
Lead	6.6	100	15	<100 (<100)	<100 (<100)	<100 (<100)						<100		<100

☐ CT&E Data.
N/A Not available.

TABLE 4-3. GARAGE ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Wainwright
Site: Garage (SS07)

Matrix: Surface Water
Units: µg/L

METALS ANALYSES: TOTAL
(DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range for 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blanks
					SW01	SW03						EB02		
Laboratory Sample ID Numbers					4484-1	4484-2						4483-9		4483 4484
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L						µg/L		µg/L
Magnesium	47.8	200		<5,000-53,000 (2,600-54,000)	41,000 (60,000)	62,000 (41,000)						<200		<200
Manganese	1.24	50		<50-510 (<50-120)	<50 (<50)	<50 (<50)						<50		<50
Molybdenum	N/A	50		<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Nickel	5.5	50	100	<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Potassium	1,154	5,000		<5,000 (<5,000)	<5,000 (<5,000)	<5,000 (<5,000)						<5,000		<5,000
Selenium	62.4	100	50	<100 (<100)	<100 (<100)	<100 (<100)						<100		<100
Silver	2.6	50	50	<50 (<50)	<50 (<50)	<50 (<50)						<50J		<50
Sodium	27.7	250		8,400-410,000 (8,200-450,000)	49,000 (51,000)	51,000 (48,000)						<250		<250
Thallium	0.57	5	2	<5 (<5)	<5 (<5)	<5 (<5)						<5		<5
Vanadium	1.8	50		<50 (<50)	<50 (<50)	<50 (<50)						<50		<50
Zinc	8.2	50		<50-160 (<50)	440J (<50)	<50 (<50)						<50		<50

☐ CT&E Data.
N/A Not available.
J Result is an estimate

TABLE 4-4. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE GARAGE (SS07)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b] CANCER	RBSL[b] NON-CANCER	ARAR[c]	CHEMICAL OF CONCERN[d]
Garage (SS07)	Soil/Sediment	DRPH	120,000J	mg/kg	<50-<300J	--	--	500[e]	Yes
		GRPH	120J	mg/kg	<2J-<5J	--	--	100[e]	Yes
		RRPH	77,000	mg/kg	<100-<600	--	--	2,000[e]	Yes
		Ethylbenzene	4NJ	mg/kg	<0.020-<0.400	--	2,700	--	No
		p-Isopropyltoluene	0.502	mg/kg	<0.02-<0.4	--	--	--	Yes*
		Naphthalene	0.393	mg/kg	<0.020-<32.0	--	1,100	--	No
		Tetrachloroethene	11.5	mg/kg	<0.020-<0.400	1.23	270	--	Yes
		1,2,4-Trimethylbenzene	0.714	mg/kg	<0.020-<0.400	--	--	--	Yes*
		1,3,5-Trimethylbenzene	5.36	mg/kg	<0.02-<0.4	--	--	--	Yes*
		Xylenes	18NJ	mg/kg	<0.040-<0.200	--	54,000	--	No
		Aluminum	2,800	mg/kg	1,500-25,000	--	--	--	No
		Barium	240	mg/kg	27-390	--	1,890	--	No
		Calcium	6,100	mg/kg	360-59,000	--	--	--	No
		Chromium	30	mg/kg	<4.3-47	--	135	--	No
		Cobalt	8.6	mg/kg	<5.1-12	--	--	-	No
		Copper	39	mg/kg	<2.7-45	--	999	--	No

* Chemicals without an RBSL or ARAR are considered chemical of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are considered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e Target cleanup levels for DRPH, GRPH, and RRPH in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.

TABLE 4-4. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE GARAGE (SS07) (CONTINUED)

SITE	MATRIX	CHEMICAL DETECTED[a]	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[b]		ARAR[c]	CHEMICAL OF CONCERN[d]
						CANCER	NON-CANCER		
Garage (SS07) (Continued)	Soil/Sediment (Continued)	Iron	114,000	mg/kg	5,400-35,000	--	--	--	No
		Lead	130	mg/kg	<5.1-22	--	--	500[f]	No
		Magnesium	3,300	mg/kg	360-7,400	--	--	--	No
		Manganese	1,250	mg/kg	25-290	--	3,780	--	No
		Nickel	29	mg/kg	4.2-46	--	540	--	No
		Potassium	425	mg/kg	<300-2,200	--	--	--	No
		Sodium	100	mg/kg	<160-680	--	--	--	No
		Vanadium	34	mg/kg	6.3-59	--	189	--	No
		Zinc	240	mg/kg	9.2-95	--	8,100	--	No
	Surface Water	1,2-Dichloroethane	1.8J	µg/L	<1	0.934	--	5[g]	**Yes**
		bis-(2Ethylhexyl)Phthalate	16	µg/L	<10-<13	6.07	73	--	**Yes**
		Barium	240	µg/L	<50-93	--	256	2,000[h]	No
		Calcium	37,000	µg/L	4,500-8,800	--	--	--	No
		Iron	2,900	µg/L	180-2,800	--	--	--	No
		Magnesium	62,000	µg/L	<5,000-53,000	--	--	--	No
		Sodium	51,000	µg/L	8,400-410,000	--	--	--	No
		Zinc	440	µg/L	<50-160	--	1,100	5,000[i]	No

* Chemicals without an RBSL or ARAR are considered chemical of potential concern and are discussed in the Wainwright Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a The concentrations for metals in surface water are total metals.
b Risk-Based Screening Level.
c Applicable or Relevant and Appropriate Requirement.
d The COCs selected for each site do not include metals that are considered essential human nutrients; however, these chemicals are discussed in the Wainwright Risk Assessment (U.S. Air Force 1996).
e Target cleanup levels for DRPH, GRPH, and RRPH in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.

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5.0 FEASIBILITY STUDY

The purpose of this section is to present the FS of remedial alternatives for the sites at Wainwright radar installation recommended for remedial action. These sites were identified based on the findings of the RI, reported in Sections 1.0 through 4.0 of this document, and the Wainwright Risk Assessment (U.S. Air Force 1996). The Wainwright sites recommended for remedial action and covered by this FS are:

- Diesel Fuel Spills (SS04) and
- Garage (SS07).

Complete RI results for these sites are presented in Section 4.0. This FS describes the evaluation of remedial alternatives used as the basis for the selection of the proposed remedial actions for the sites presented in Section 4.0.

Sites requiring no further action based on the RI and risk assessment are not included in this section. The proposed no further action sites are the Drum Storage Area (ST02), Landfill (LF05), Airstrip Diesel (SS08), and Vehicle Storage Area (SS09). RI results for these sites are presented in Section 3.0.

This FS complies with the NCP. It has been streamlined as described in the following section. The remainder of the introduction consists of a discussion of the streamlining approach, including risk management decisions, and an outline of the organization of the FS.

5.0.1 Approach To Feasibility Study

This FS is streamlined as follows to expedite remediation and minimize unnecessary evaluation of remedial alternatives for the sites at Wainwright.

- The FS was conducted with the focus on contaminated media instead of individual sites, specifically the soil areas underneath buildings. It would not be practical to remediate these sites individually. The sites have been aggregated by contaminated media because they are small and similar in types of contamination, and the installation is too remote to remediate individual sites efficiently. In addition, developing alternatives by medium reduces unnecessary repetition.

- The decision was made at this point to leave the tundra at the Garage (SS07) undisturbed in lieu of screening a number of technologies, and developing and evaluating remedial alternatives. The analytical results of a sediment sample taken at this site indicate levels of DRPH and RRPH of 120,000 mg/kg and 77,000 mg/kg, respectively. Possible bioremedial approaches include passive (assisted) bioremediation and naturally occurring bioremediation. Models used to estimate the duration of remediation for these approaches indicate that it will take 7 to 22 years for DRPH concentrations, and 57 to 105 years for RRPH concentrations, to meet ADEC guidance cleanup levels, depending on the approach chosen. Given

such long time frames passive (assisted) bioremediation is essentially the same as naturally occurring bioremediation. The alternative to bioremediation for remediating this area is aggressive cleanup, most likely involving excavation that would seriously disturb the tundra.

No action appears to be the most protective alternative, then, for tundra. ADEC has found that aggressive physical remediation of tundra is more harmful ecologically than the impact of petroleum hydrocarbons (ADEC Interim Guidance for Non-UST Contaminated Soil Cleanup Levels, Guidance Number 001 - Revision Number 1, July 17, 1991, pp 10). Furthermore, the Wainwright installation is inactive; therefore, the likely sources of this contamination, spills from day tanks and floor drains, have been eliminated. Remediation of soils in the area of these sources is the focus of this FS.

- Repetition of information presented in the RI (Section 1.0 through 4.0 of this report) and Wainwright Risk Assessment is minimized. Data essential to evaluating remedial alternatives is presented in summary tables.

  The summary table recommended in the AFCEE Handbook (U.S. Air Force 1991a) has been adapted to focus on the data essential to the evaluation of remedial alternatives. Wherever possible, reference is made to the RI and risk assessment for detailed site information, and assumptions used in calculating risk and identifying COCs.

- The alternatives evaluated are limited to those likely to be effective. General response actions and applicable technologies are screened together, and the alternatives are limited to no more than five successfully applied conventional and innovative methods including the required no action alternative.

5.0.2 Risk Management Decisions

Two risk management decisions were made in writing the FS based on a thorough review of the data, one relating to COCs, and the second to surface water. These decisions are necessary to focus the results of the RI and risk assessment into workable and protective remedial alternatives.

Tetrachloroethene is identified as a COC in Table 4-4 and in the risk assessment. It was detected in soil at two locations at the Garage (SS07), and is listed as a COC because the concentration exceeds the cancer RBSL. The RBSL in the risk assessment was based on an cancer risk of 10^{-7} (1 in 10,000,000). Cleanup levels for individual contaminants generally is not required if the lifetime cancer risk is less than 10^{-6} (EPA 1991b). Tetrachloroethene concentrations, considered individually, do not exceed a risk level of 10^{-6} at Wainwright. For this reason, tetrachloroethene is not considered a COC in this FS.

Surface water in tundra areas has been impacted by sources of contamination at the installation. Methods for remediating surface water directly are not promising because the surface water is

extremely shallow, covers a wide area, is frozen for over half the year, and is intimately associated with tundra. ADEC recognizes that physical remedial actions in tundra are often more ecologically damaging than the petroleum hydrocarbons (ADEC 1991). Instead of evaluating direct remedial alternatives for surface water in otherwise natural tundra areas, we have taken the approach that remediation of the source will improve the quality of surface water over time; therefore, COCs identified in surface water are not considered in the preparation of this FS.

These risk management decisions permit the focus of the FS to be on cleaning up the sources of contamination at the Wainwright installation. The primary contaminant at the installation is diesel. Other contaminants include gasoline, residual range petroleum hydrocarbons, and BTEX compounds. Individually, the BTEX compounds benzene, toluene, ethylbenzene, and xylenes are not COCs. The sum of their concentrations, however, makes them a collective COC based on the ADEC Interim Guidance for Non-UST Contaminated Cleanup Levels (ADEC 1991).

5.0.3 Organization

The FS is organized as follows:

- Introduction;
- Site Characterization for Remediation (considers COCs, ranges of chemicals detected, estimated areas and volumes of affected media, ARARs, and target cleanup levels or proposed remediation goals for each site);
- Screening of General Response Actions and Presentation of Representative Remedial Technologies;
- Development of Remedial Alternatives;
- Detailed Evaluation of Remedial Alternatives (the detailed analysis is based on the AFCEE guidance and includes analyses of the nine NCP criteria). The detailed evaluation also includes a comparative analysis of alternatives, and identification of preferred alternatives);
- Siting Study; and
- Detailed cost estimates and estimates of project duration in attachments A and B, respectively.

5.1 SITE CHARACTERIZATION FOR REMEDIATION

Information relevant to the screening and evaluation of remedial alternatives for the two sites at Wainwright is summarized in Tables 5-1 and 5-2. The tables include COCs in site soils/sediments, ranges of chemicals detected, estimates of volumes of affected media, and the basis for listing each as a COC. Tables 5-1 and 5-2 do not include site COCs that were

determined not to be significant to the selection of site remedial alternatives and are discussed in Section 5.0.2.

5.1.1 Summary of Site Information

The information considered for each site includes:

- medium;
- COCs;
- range of chemicals detected;
- target cleanup level (or proposed remediation goal - the lowest applicable action level based on the risk assessment including cancer risk, noncancer hazard quotient, and chemical-specific ARARs);
- basis for the target cleanup level (specific ARAR, cancer risk or noncancer hazard quotient); and
- design parameters for remedial action.

5.1.2 Estimated Areas, Volumes, and Masses of Contaminated Media

The approximate areas, volumes, and mass of the contaminated media are presented in Table 5-3 for use in the medium-specific rather than site-specific approach discussed in the introduction. Areas and depths are estimated based on the RI, and the density is estimated to be 1.8 tons/cubic yard. The locations and estimated volumes of the contaminated media are illustrated in Figure 5-1. The medium considered for remediation in this FS is the soil area beneath the structures at the Diesel Fuel Spills (SS04) and the Garage (SS07). The tundra will not be considered, as was stated in Section 5.0.1. The total volume of the medium to be remediated is:

- Soil underneath buildings - approximately 266 cubic yards.

General response actions and remedial alternatives are screened and evaluated for this medium.

Estimates of cost and project duration are provided in Attachments A and B, respectively. These attachments are located at the end of Section 5.0.

5.1.3 ARARs

According to the NCP, ARARs must be identified and evaluated to determine all of the requirements for remedial actions. There are three categories of ARARs:

- Chemical-specific;
- Action-specific; and
- Location-specific.

TABLE 5-1. REMEDIAL ACTION CHARACTERIZATION FOR DIESEL FUEL SPILLS (SS04)

MEDIA	CONTAMINANTS	RANGE OF ENVIRONMENTAL CONTAMINATION	TARGET CLEANUP LEVEL[a]	BASIS FOR LISTING AS COC	VOLUME OF CONTAMINATED MEDIA	DESIGN PARAMETERS
Soil Underneath Building	DRPH	ND - 4,900 mg/kg	500 mg/kg	ADEC Non-UST[b] Action Level	156 cubic yards (cy)	• Accessibility • Contaminant • Concentration • Solubility • Drainage
	GRPH	ND - 120 mg/kg	100 mg/kg	ADEC Non-UST Action Level		
	BTEX	ND - 24 mg/kg	10 mg/kg	ADEC Non-UST Action Level		

TABLE 5-2. REMEDIAL ACTION CHARACTERIZATION FOR GARAGE (SS07)

MEDIA	CONTAMINANTS	RANGE OF ENVIRONMENTAL CONTAMINATION	TARGET CLEANUP LEVEL[a]	BASIS FOR LISTING AS COC	VOLUME OF CONTAMINATED MEDIA	DESIGN PARAMETERS
Soil Underneath Building	DRPH	570 - 8,300 mg/kg	500 mg/kg	ADEC Non-UST Action Level	110 cy	• Accessibility • Contaminant • Concentration • Solubility • Drainage
	GRPH	8 - 120 mg/kg	100 mg/kg	ADEC Non-UST Action Level		
	RRPH	530 - 2,400 mg/kg	2,000 mg/kg	ADEC Non-UST Action Level		
	BTEX	1.2 - 19 mg/kg	10 mg/kg	ADEC Non-UST Action Level		

[a] Target cleanup levels for DRPH, GRPH, and BTEX in soil are based on ADEC Non UST guidance and do not necessarily correspond to final site specific cleanup goals.

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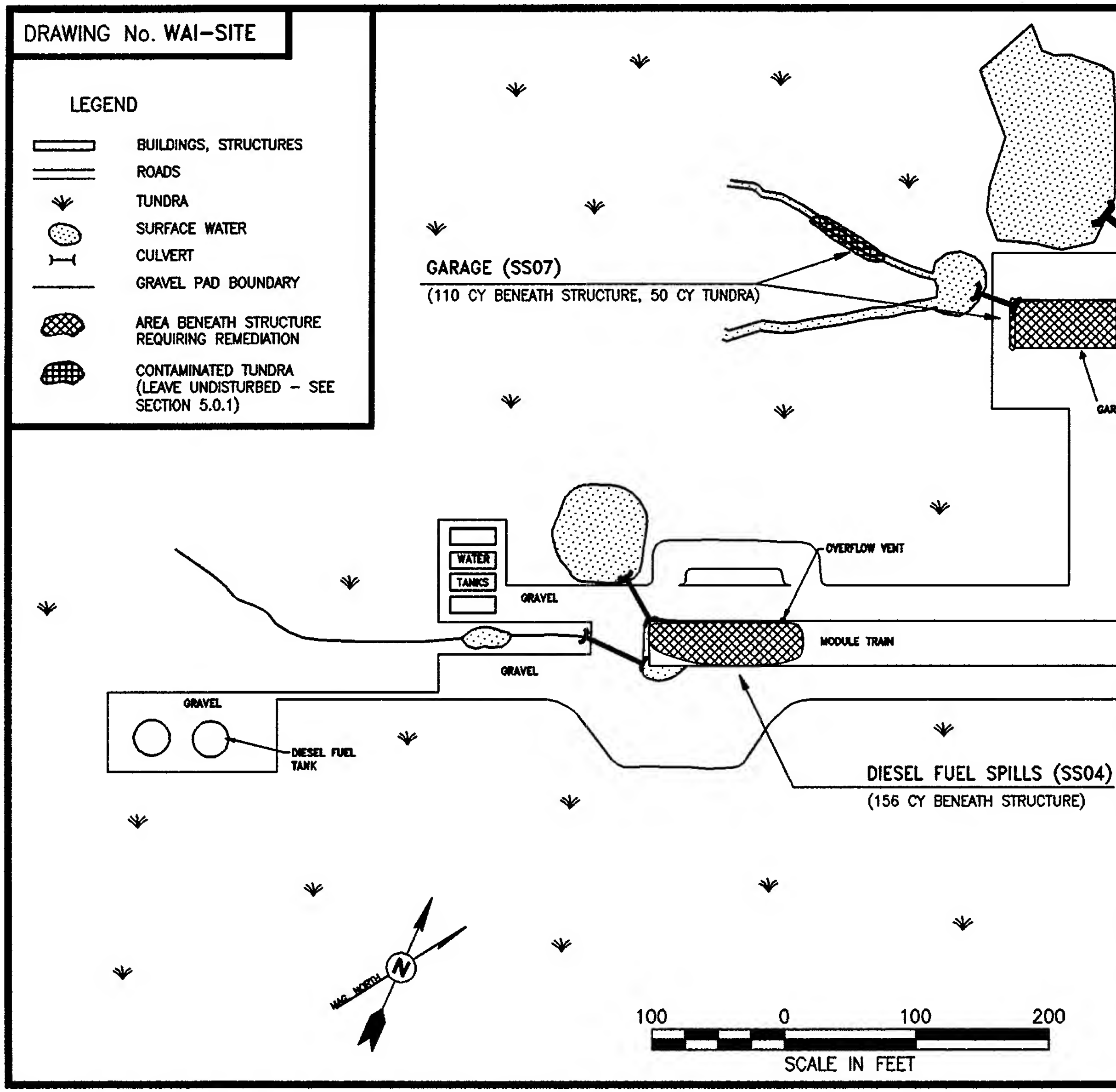

WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 5–1

LOCATIONS AND ESTIMATED VOLUMES OF CONTAMINATED MEDIA AT WAINWRIGHT

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TABLE 5-3. APPROXIMATE AREAS, VOLUMES AND MASSES OF CONTAMINATED MEDIA BY SITE AT WAINWRIGHT

SITE	MEDIUM	AREA (sq ft)	DEPTH (ft)	VOLUME (cy)	MASS (tons)
Diesel Fuel Spills (SS04)	Soil beneath west end of module train	4,200	1	156	280
Garage (SS07)	Soil beneath garage	3,000	1	110	200

Chemical-specific ARARs are action levels that may apply in addition to risk or hazard-based remediation goals. Chemical-specific ARARs were identified during the RI and included in the risk assessment. The target cleanup levels or proposed remediation goals represent the lowest applicable action level.

Action-specific ARARs are requirements that relate to how remedial actions must be conducted. For example, offsite transport of hazardous waste must be manifested in compliance with the RCRA.

Location-specific ARARs impose requirements on a remedial action based on the location of the site. For example, there are specific requirements that pertain to wetlands.

It should be noted that ADEC's Interim Guidance for Non-underground storage tank (UST) contaminated soil target cleanup levels is intended as guidance and does not necessarily correspond to final site specific cleanup levels. The ARARs for the sites at the Wainwright installation are presented in Table 5-4.

5.2 SCREENING OF GENERAL RESPONSE ACTIONS

5.2.1 Presentation and Screening of General Response Actions

General Response Actions (GRAs) are general approaches for remedial actions. GRAs can be active or passive measures. Active measures involve removal, active treatment, or isolation of the contaminated media. Passive measures rely on natural processes to reduce the toxicity, mobility, or volume of contamination, or on controls put in place to limit exposure. GRAs apply to contaminants in all of the environmental media separately, or in any combination. Screening GRAs streamlines the FS process by establishing the feasibility of entire classes of remedial responses, thereby enabling the selection of a focused set of viable alternatives for detailed evaluation. GRAs have been evaluated for the medium contaminated at the Wainwright installation: soil beneath buildings.

TABLE 5-4. ARARs FOR SITES AT THE WAINWRIGHT INSTALLATION

AUTHORITY	CITATION	TYPE OF ARAR	BASIS	CATEGORY OF ARAR
Clean Air Act	42 U.S.C. 7401-7642, 40 CFR 60, 61, and 63	Action-specific	National Ambient Air Quality Standards (Treatment technology standards for fugitive emissions and landfills)	Applicable
ADEC, Interim Guidance for Non-UST Action Levels	18 AAC 75.140	Chemical-specific	Standards for general guidance	Relevant and Appropriate
RCRA	40 CFR Part 263	Action-specific	Standards applicable to generators of hazardous waste	Relevant and Appropriate
RCRA	40 CFR 268	Action-specific	Land Disposal Restrictions	Relevant and Appropriate
ADEC, Interim Guidance for Surface and Groundwater Cleanup Levels	AS 46.03.070, AS 46.09.020, 18 AAC 70.020 (b), AS 46.04.020, 18 AAC 75.140, 18 AAC 70.025, 18 AAC 70.030 18 AAC 70.010, and 18 AAC 70.040	Location-specific	Standards applicable for water used for drinking and surface water important to the growth and propagation of aquatic life	Relevant and Appropriate
RCRA	40 CFR Part 263	Action-specific	Standards applicable to transporters of hazardous waste	Relevant and Appropriate
Toxic Substances Control Act	40 CFR 761.60(a)(4)	Action-specific	Disposal requirements for PCBs	Applicable
OSWER Solid Lead Cleanup Guidance	Updates on OSWER Solid Lead Cleanup Guidance, August 29, 1991 (EPA 1991c)	Chemical-specific	Standard applicable for concentration of lead in soil	Relevant and Appropriate
ADEC, Interim Guidance for Surface and Groundwater Cleanup Levels	AS 46.03.070 AS 46.09.020 AS 46.04.020 18 AAC 70.020 18 AAC 75.140	Chemical-specific	Standards applicable for water used for drinking and surface water important to the growth and propagation of aquatic life	Relevant and Appropriate
RCRA	40 CFR Part 264, 265, 270	Action-specific	Standards applicable to hazardous waste disposal facilities	Relevant and Appropriate
SDWA	52 FR 25690 56 FR 3526	Chemical-specific	Maximum Contaminant Level for drinking water	Relevant and Appropriate

TABLE 5-4. ARARs FOR SITES AT THE WAINWRIGHT INSTALLATION (CONTINUED)

AUTHORITY	CITATION	TYPE OF ARAR	BASIS	CATEGORY OF ARAR
RCRA	55 FR 30798	Action-specific	Standard for Solid Waste Management Units, SWMUs[a], in the RCRA Corrective Action Program	Relevant and Appropriate

[a] SWMU = Solid Waste Management Unit.

The GRAs considered for the Wainwright installation are:

- No action;
- Institutional controls and monitoring;
- Containment;
- Onsite treatment; and
- Removal.

These GRAs are defined as follows.

No action. Under the no action GRA contaminants are left in place and only natural processes, such as biodegradation, would lower the concentrations of COCs.

Institutional controls and monitoring. The institutional control GRA is a passive response in which steps are taken to minimize the possibility of accidental exposure of humans and the environment to COCs. Institutional controls may include fences to minimize exposure, and public education. Institutional control of sites contaminated by petroleum hydrocarbons minimizes the chances of accidental exposure while passive biodegradation occurs. Monitoring is included to determine if migration of contaminants is occurring and if natural processes are lowering the concentrations of the COCs.

Containment. The containment GRA limits the potential for accidental exposure to contaminants by physical means. Examples include soil caps and solidification. The objectives are: 1) to minimize the risk of direct exposure to contaminated soils; 2) to eliminate the possibility of contaminants or contaminated soils becoming airborne and migrating; and 3) to prevent water from entering the contaminated area and transporting contaminants to other areas.

Onsite treatment. Treatment may be used to reduce the toxicity, mobility, or volume of a contaminant and may be accomplished in situ or ex situ. In situ treatment involves active treatment with the medium in place. Ex situ treatment involves the removal of the contaminated medium, with subsequent treatment on the installation. The medium may be replaced in the original excavation after treatment. Efficiencies vary depending on the technique used and the type of contaminant present.

Removal. Removal involves excavating the contaminated medium and shipping it offsite for treatment or disposal. Removal reduces the risk of exposure to the contaminant, because it no longer remains at the installation. There is some risk to remedial workers undertaking such a removal.

The applicability of these GRAs at Wainwright was determined using AFCEE screening criteria: implementability, project duration, effectiveness, and cost benefit. Representative technologies for the GRAs retained are presented and screened in Section 5.2.2. Screening was performed as follows.

5.2.1.1 Screening of GRAs for Areas Beneath Buildings. GRAs considered for remediation of the area beneath structures (principally tundra soil) are presented in Table 5-5. No action, institutional controls and monitoring, and treatment were retained for evaluation.

5.2.2 Presentation of Technologies

This section describes remedial technologies considered for use at sites at the Wainwright radar installation. GRAs retained in Section 5.2.1 that represent technologies proven effective in the Alaskan environment were selected. The conditions present at the Wainwright radar installation, principally the arctic climate and remote location, exclude many technologies that could be considered for sites in a more temperate and accessible location.

The remedial technologies under consideration for the contaminated media at the Wainwright installation are presented in this section by GRA as follows:

<u>No Action</u>

- No action

<u>Institutional Controls and Monitoring</u>

- Periodic monitoring
- Public education
- Fencing

<u>Containment</u>

- Maintenance of freezing conditions

<u>Onsite Treatment</u>

- Passive bioremediation
- Landspreading
- Biosurfactants

All of the technologies presented above have been applied effectively at sites on the North Slope or elsewhere in Alaska. In addition to being effective in cold climates, they are well-suited to the short summer season (the only favorable time for outdoor remedial activities) and the remote location where there is little or no staffing for year-round operation and maintenance of remedial systems. Specifically, these remedial technologies are either short-term actions that can be completed in one season (approximately 100 days) with imported labor, or longer term actions that are self-sustaining and require minimal labor.

Several of the remedial technologies involve bioremediation, which may be accomplished on the North Slope with psychrophilic (i.e., cold weather) microorganisms both indigenous and imported.

TABLE 5-5. SCREENING OF GENERAL RESPONSE ACTIONS FOR REMEDIATION OF SITES AT WAINWRIGHT

GENERAL RESPONSE ACTION	REPRESENTATIVE TECHNOLOGIES	PROJECTED TREATMENT EFFICIENCY	RETAINED OR REJECTED	RATIONALE
No action	• No action	50 percent	Retained	Implementability: Moderate Duration: Long Effectiveness: Low to Moderate Cost: Low Retained/Rejected: Retained (requirement of NCP).
Institutional controls and monitoring	• Periodic monitoring • Public education • Fencing	50 percent	Retained	Implementability: High Duration: Long Effectiveness: Low to Moderate Cost: Low Retained/Rejected: Retained due to high implementability and low cost. The amount of nutrients in gravel may be too low for biodegradation.
Containment	• Maintenance of freezing conditions	90 percent reduction in mobility	Retained	Implementability: High Duration: Long Effectiveness: High Cost: Low to Moderate Retained/Rejected: Retained due to high implementability, effectiveness, and low cost.
Treatment	• Passive bioremediation • Biosurfactants	90 percent	Retained	Implementability: High Duration: Short to Moderate Effectiveness: Moderate to High Cost: Moderate Retained/Rejected: Retained due to high implementability, moderate to high effectiveness, and short to moderate duration.
Removal	• Excavation and offsite treatment	100 percent	Rejected	Implementability: High Duration: Short Effectiveness: High Cost: High Retained/Rejected: Rejected due to high cost.

Bioremediation has been documented on the North Slope and elsewhere in Alaska, but is subject to several limiting factors including:

- Availability of nutrients and oxygen;
- Short periods of thaw; and
- Percentage of fine-grained materials.

Biodegradation generally can be estimated in terms of first order kinetics, where the only rate limiting factor is the biodegradation potential, which is a function of the factors listed above. With first order kinetics, a given target cleanup level will eventually be reached regardless of the initial concentration; however, as the gap between initial and target concentrations widens or rate limiting factors become more significant, the time necessary to reach the target increases exponentially because the function plots asymptotically with concentration. A more detailed discussion of the estimates of passive biodegradation is presented in Section 5.4.

Descriptions of the technologies that have been retained are presented in the following subsections.

5.2.2.1 No Action. Required alternative.

5.2.2.2 Institutional Controls and Monitoring. This technology involves no active treatment, but takes advantage of natural, unassisted biodegradation that occurs in the arctic soil (Atlas 1985). Natural, unassisted bioremediation typically takes longer than assisted bioremediation. The rate of biodegradation, especially in the North Slope region, is reduced because of short warm seasons and prolonged harsh winters. Public education and fencing off the affected area would constitute institutional controls, and monitoring would include sampling and analysis of any associated surface water and soil/sediment.

Institutional controls and monitoring are being evaluated for petroleum-related contaminants in the soils beneath structures. The case studies used to support biodegradation-based alternatives are used to estimate potential rates of natural, unassisted bioremediation.

5.2.2.3 Containment. The contaminated soil beneath the module train associated with the Diesel Fuel Spills (SS04) and the Garage (SS14) represents a difficult remedial problem because the Air Force does not intend to raze the structures at this time. Vertical access is insufficient to manually remove the contaminated soil or to use equipment to do so beneath the Garage (SS07). There is sufficient vertical clearance beneath the module train associated with the Diesel Fuel Spills (SS04) to make manual activities feasible. One solution is to maintain freezing conditions under the buildings year round to keep contaminants locked in ice or frozen ground. The underside of the module train and the Garage are relatively cold year-round because they remain shaded during the summer. Examples of cold containment include insulation with gravel cover and heat exchangers (or a combination of the two). Once the buildings are dismantled, the contaminated soil can be excavated and managed appropriately.

5.2.2.4 Passive Bioremediation. Passive bioremediation in this FS involves delivering water and nutrients to the contaminated soils in place to assist natural bioremediation. Several

organisms that can utilize the carbon in petroleum are indigenous to the North Slope, including: *Bacillus cereus, Bacillus polymixa, Arthrobacter globiformis*, and *Alcaligenes poradoxus* (Ratliff 1993). In addition, several strains of *Pseudomonas* bacteria (psychrophilic genera) decreased TPH concentration in tundra during the summer season in the Prudhoe Bay area (Jorgenson et al. 1992). A case study conducted at Point Thompson, Alaska, suggests that this approach is feasible for remediation of gravel pads if a cultured population of microbes is used (Liddell 1991). The cultured population could be either indigenous or exotic. A treatability study will be necessary to determine the site-specific biodegradation potential of the sites beneath the buildings. Alternatively, the findings of a treatability study of the bioremediation potential of soils beneath a building at one of the other installations, if available, could be used to estimate treatability of the soils beneath the two buildings at the Wainwright installation.

Variations in temperature affect the rate of biodegradation by bacteria. In the arctic environment, bacteria remain active enough to consume petroleum hydrocarbon molecules from June through August when average temperatures fluctuate between 33.8 and 42.8°F. Successful biodegradation of petroleum hydrocarbon contaminants in soil by indigenous bacteria is possible at the arctic summer ambient temperatures (Jacobson et al. 1982). Another study at Surfcote Pad in the Prudhoe Bay area (Evans, Elder, and Hoffman 1992) indicates that native microbial populations were capable of bioremediating diesel contaminated gravel at an appreciable rate during the short summer season. In the arctic environment at a depth of three feet microbial populations can effectively consume hydrocarbon products (Atlas 1985); however, the number and activity of bacteria decrease with depth because of reduced levels of oxygen and nutrients.

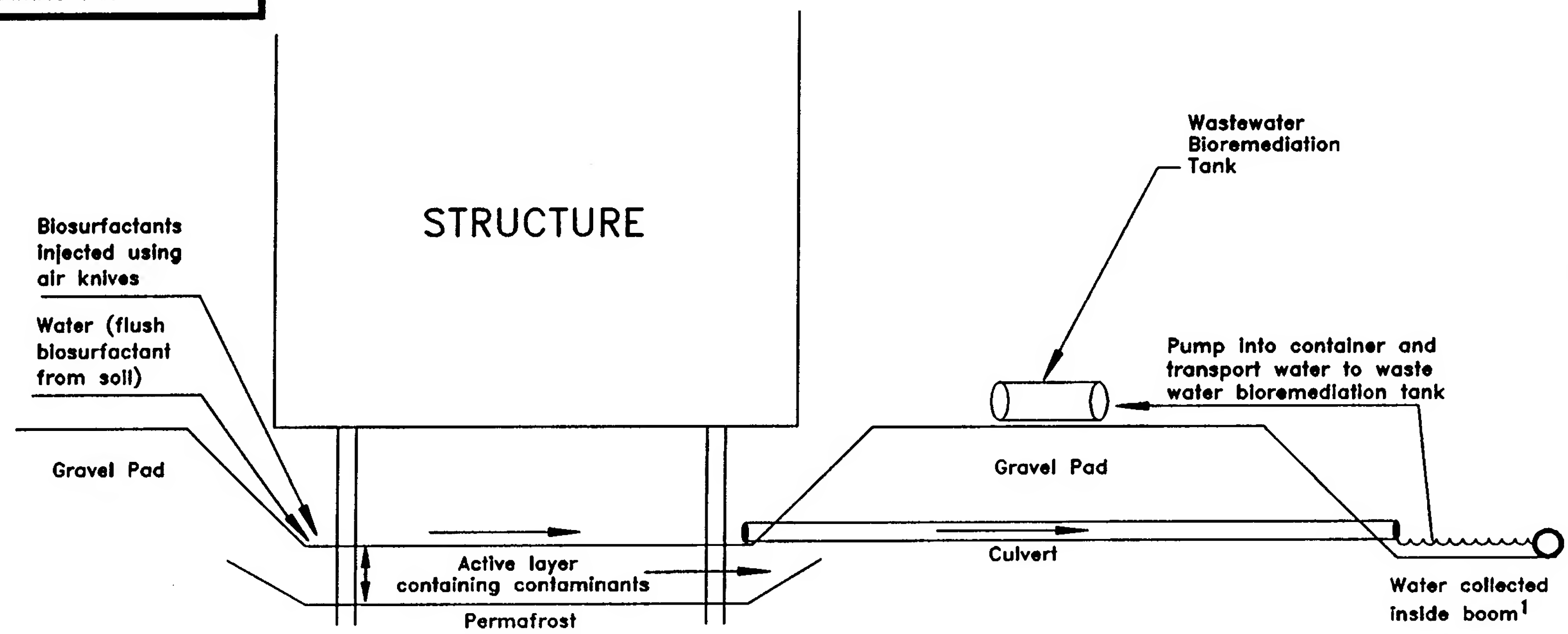
Passive bioremediation is being evaluated for the soil underneath the buildings. Warm water with nutrients could be applied to contaminated soils under the structures associated with the Diesel Fuel Spills (SS04) and the Garage (SS07) to provide conditions necessary for bioremediation.

It is anticipated that this process would not generate runoff. Nonetheless, a wastewater discharge permit or solid waste disposal permit may be required for this process and precautions will be taken to contain any runoff that occurs. It is not expected that contaminants would be mobilized by this process, but any collected runoff would be analyzed to confirm this.

5.2.2.5 Biosurfactants. Biosurfactants have been used to remove hydrocarbons from contaminated soils and gravels. Biosurfactants are products of bacterial fermentation and may include sugars, fats, and proteins. They act by attaching to, and surrounding, hydrocarbon molecules thus detaching them from soil particles. Biosurfactants do not alter the structure of the hydrocarbons, but render them temporarily inert, preventing them from reattaching to soil particles and allowing their removal from soils by flushing with water. The flush water mixture is then collected and the biosurfactant-hydrocarbon mixture, which floats on water, is removed by skimming. The collected mixture of water and petroleum hydrocarbons could be bioremediated onsite in an aerated tank spiked with nutrients. Figure 5-2 is a diagram of the process.

This technology is being evaluated for treating DRPH, GRPH, RRPH, and BTEX at the Diesel Fuel Spills (SS04) and Garage (SS07). It is readily available in Alaska and involves using high intensity "air knives" to jet the biosurfactant into the material being remediated. It is anticipated

DRAWING No. WAIBSURF



1. Booms and other collection materials will be tested and disposed of offsite.

WAINWRIGHT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 5-2

IN SITU USE OF BIOSURFACTANTS PROCESS FLOW DIAGRAM

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from the results of the site investigations that contamination beneath the structures is shallow (less than two feet) because permafrost close to the surface prevents the hydrocarbons from infiltrating deeply.

The "air knives" can probably penetrate far enough to mobilize all of the contamination. After the biosurfactant is applied, the medium will be flushed with water to remove the mix of hydrocarbons and surfactant. The flush water mixture will be collected from drainage pathways exiting areas beneath the two buildings. Collected water could be recirculated to minimize volume. Upon completion, collected water (500 - 1,000 gallons) could be evaporated, bioremediated, and/or treated with carbon adsorption units. Performance may not match case histories involving fairly fresh crude oil on rock surfaces, but it is anticipated that the mobile fraction of the weathered petroleum will be dislodged sufficiently for successful remediation. Because of the uncertainty associated with this new application of biosurfactants, a treatability test is included in the cost estimate. In addition, the estimated efficiency of this technology has been reduced from 97 to 90 percent in an effort to account for the uncertainty. Treatability testing could be conducted on a limited area directly below a garage floor drain, and would only be required at one of several DEW Line garage sites.

5.3 DEVELOPMENT OF REMEDIAL ALTERNATIVES

5.3.1 Approach to Developing Remedial Alternatives

The remedial technologies selected in Section 5.2.2 represent the GRAs retained in Section 5.2.1. In this section the remedial technologies are developed into alternatives designed to address site-specific COCs. Alternatives developed in this section are evaluated in the Detailed Evaluation of Remedial Alternatives, Section 5.4.

This section is organized by remedial alternative. The rationale for development and a list of applicable sites are included. At the end of the section is a summary table of remedial alternatives.

The remedial alternatives are:

<u>Soil beneath the structures associated with the Diesel Fuel Spills (SS04) and the Garage (SS07)</u>

- No action;
- Institutional controls and monitoring;
- Containment;
- Passive bioremediation; and
- Biosurfactants.

5.3.1.1 No Action.

Rationale for Development. No action provides a baseline against which other alternatives are compared, and it is a required alternative according to the NCP. Natural, unassisted

biodegradation of petroleum hydrocarbons may occur over a long period of time if microbial populations and aerobic conditions (e.g., water, oxygen, temperature, and nutrients) are present. Natural, unassisted biodegradation has most frequently been documented in tundra, and is less likely to be effective in soil beneath the two buildings.

Applicable Media and Sites.

- Soil beneath the structure associated with the Diesel Fuel Spills (SS04) and
- Soil beneath the Garage (SS07).

5.3.1.2 Institutional Controls and Monitoring.

Rationale for Development. This limited action alternative is applicable because the COCs do not pose a significant risk or have an HQ above threshold levels. Although some risks and hazards exceed threshold levels, they were calculated conservatively based on a future scenario and are probably overestimated in the risk assessment (U.S. Air Force 1996). Natural, unassisted biodegradation of petroleum hydrocarbons may occur over a long period of time if microbial populations and aerobic conditions (e.g., water, oxygen, temperature, and nutrients) are present. Natural, unassisted biodegradation has most frequently been documented in tundra, and is less likely to be effective in gravel and soil beneath the two buildings.

Institutional controls considered include public education and fencing off the affected area. Monitoring would be conducted periodically for two years to determine if contaminants are biodegrading. Monitoring data would be combined with the predicted degradation rate presented in this section to demonstrate the effectiveness of natural, unassisted biodegradation.

Applicable Media and Sites.

- Soil beneath the structure associated with the Diesel Fuel Spills (SS04) and
- Soil beneath the Garage (SS07).

5.3.1.3 Containment.

Rationale for Development. The soil beneath the structures associated with the Diesel Fuel Spills (SS04) and the Garage (SS07) poses several technical problems because the Air Force has no immediate plans to dismantle the buildings. Vertical access is limited, especially beneath the Garage (SS07); therefore, conventional excavation is infeasible. Containment by maintenance of freezing conditions could be an effective way to prevent the migration of contaminants until the building is dismantled or a highly effective remedial technology becomes available. Human exposure would be very limited because of the low vertical clearance. Several methods exist for maintaining freezing conditions beneath buildings in Alaska. Methods include insulation, gravel cap, heat exchangers, or a combination of the three.

Applicable Media and Sites.

- Soil beneath the structure associated with the Diesel Fuel Spills (SS04) and
- Soil beneath the Garage (SS07).

5.3.1.4 Passive Bioremediation.

Rationale for Development. This is a low maintenance method for reducing petroleum concentrations. Passive bioremediation in this FS is assisted bioremediation. The assistance is low level and includes the addition of appropriate amounts of nutrients, lime, and moisture. It is assumed that sufficient oxygen is present to support aerobic metabolism of hydrocarbons. A treatability study will be necessary to demonstrate site-specific viability of this alternative. For example, shading, wind, and resulting colder temperatures beneath the buildings may reduce microbial metabolic activity.

Monitoring for two years will verify the progress of the process.

Applicable Media and Sites.

- Soil beneath the structure associated with the Diesel Fuel Spills (SS04) and
- Soil beneath the Garage (SS07).

5.3.1.5 Biosurfactants.

Rationale for Development. Biosurfactants were proven effective in removing petroleum hydrocarbons from shallow soils, hard surfaces, and rocks following the Valdez oil spill. It is applicable to the soil beneath the structures associated with the Diesel Fuel Spills (SS04) and the Garage (SS07). The application of biosurfactants to soils beneath buildings carries significant uncertainly; therefore, a treatability study will be conducted to determine the viability of this approach.

Monitoring will verify the effectiveness of the remedial action.

Applicable Media and Sites

- Soil beneath the structure associated with the Diesel Fuel Spills (SS04) and
- Soil beneath the Garage (SS07).

5.4 DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

5.4.1 Approach

The alternatives developed in Section 5.3 are evaluated in this section using the suggested criteria in the AFCEE guidance for remedial alternative evaluation. These five criteria are defined in Sections 5.4.1.1 through 5.4.1.5. The detailed evaluation of alternatives is presented in Section

5.4.2 and summarized in Section 5.4.3. The alternatives are evaluated with respect to the NCP's nine criteria in Section 5.4.4. Preferred alternatives are presented in Section 5.4.5.

5.4.1.1 Successful Application Of The Technology Under Site Conditions. This criterion requires the location and approximate date of the applications and the managing entity, and a presentation of successful applications of the given alternative under conditions similar to those found at the Wainwright installation. Case studies conducted on the Alaskan North Slope are used to the extent possible, with due consideration given to the uncertainties associated with remedial technologies in this environmental setting, and to the differences in the remedial potential between weathered refined product and fresh crude. Many of the case studies are based on fresh crude.

5.4.1.2 Total Project Cost. The total cost of performing the remedial alternative is estimated and divided into technology testing, capital, total labor, operating, environmental testing, closure, and indirect costs.

For the purpose of this evaluation, the itemized cost elements are defined as follows:

- Technology testing costs consist of pilot tests or treatability studies;
- Capital costs include equipment or materials purchased;
- Total labor costs include the labor required for operating and maintaining the remedial action system, oversight, project management, design, and development of planning documents;
- Operating costs include costs other than labor associated with operating remedial systems (e.g., in situ use of biosurfactants) and earth moving;
- Environmental testing costs are for sampling and analysis, including annual monitoring, and monitoring associated with site closure; and
- Closure costs are those related to reporting associated with site closure.

5.4.1.3 Contaminant Reduction. The reduction in concentration of each COC may be projected for each medium and site based on case-study derived efficiencies. This reduction, referred to as post-remedial concentration, is listed with the initial concentration and target cleanup level. Post-remedial concentration is a more useful measure of effectiveness than risk reduction for the remedial alternatives at the Wainwright installation. None of the COCs are included because of cancer risk or noncancer HQ. Risks or HQs, therefore, are not the indicators of successful remediation. Post-remedial concentration is applicable to target cleanup concentrations set by regulations and/or cleanup guidance.

The concentrations presented in Section 5.4.3 are defined as follows:

Initial Concentration. This is the average initial concentration of the COC detected.

Target Cleanup Level. This is the cleanup level specified for the given COC (the basis for which is presented in Tables 5-1 and 5-2).

Post Remedial Concentration. This is the estimated final concentration of the COC based on remedial efficiencies from case studies. References to these case studies can be found in Section 5.4.2, Successful Applications of Alternatives. Estimated remedial efficiencies presented apply to all organic COCs for biosurfactants. For passive bioremediation, institutional controls and monitoring, and no action, the estimated remedial efficiencies differ depending on the biodegradability of the particular COC. Specific estimated efficiencies used are presented below. The estimates are independent of time (over the short term, e.g., one year, biodegradation would be significantly less efficient than active remedial alternatives like biosurfactants).

The following remedial efficiencies are used for all petroleum hydrocarbons compounds detected:

- Biosurfactants - 90 percent (case studies indicate a higher efficiency, but the unique application may result in a loss of efficiency) and

The following efficiencies are used for DRPH, GRPH, and BTEX:

- Passive bioremediation - 94 percent and
- Naturally occurring bioremediation
  (Institutional controls and monitoring and no action) - 50 percent.

The following estimated efficiencies are used for RRPH:

- Passive bioremediation - 75 percent and
- Naturally occurring bioremediation
  (Institutional controls and monitoring and no action) - 50 percent.

Components of RRPH that would not biodegrade probably are higher molecular weight hydrocarbons that pose no known risk or hazard to the environment or human health.

The post-remedial concentration is estimated using the following formula (assuming no time constraints):

Post-remedial Concentration = Initial Concentration x (1 - Remedial Efficiency)

5.4.1.4 Project Duration. The estimated duration of each remedial alternative and associated project schedule is an important consideration because of the seasonal limitations on outdoor work and the lack of personnel to perform operation and maintenance activities in this remote location. The North Slope of Alaska is frozen and covered with snow and ice for the majority of the year, leaving a period of only approximately 100 days in the summer when the weather is favorable for outdoor work. Outdoor phases of remedial actions significantly longer than 100 days must be suspended until the following summer. In order to maximize efficiency, remedial alternatives were designed to either complete outdoor phases of remediation within this

narrow time frame (e.g., biosurfactants) or extend over a longer term and require only minimal labor (e.g., passive bioremediation and institutional controls and monitoring).

Project durations are based on case studies from Alaska. The rates of biodegradation for passive bioremediation and naturally occurring bioremediation associated with institutional controls and monitoring are expressed as a first order decay function. The first-order decay function used to model this biodegradation is $C = C_o e^{-kt}$ (C is final concentration, C_o is the initial concentration, e is the natural logarithm, k is a constant based on case studies, and t is time).

The rate constant, k, is estimated based on related case studies. In general, the k-values presented reflect the lower end of the expected range of values and are downwardly adjusted because of the arctic environment conditions. The lowest rates are associated with no action and institutional controls and monitoring because there is no enhancement of conditions. Passive bioremediation ranks highest because more factors are optimized than pH. DRPH is used to estimate the constants for all of the petroleum hydrocarbons because it represents by far the highest concentrations at the two sites. The concentration of DRPH, therefore, can be assumed to be the controlling factor in determining the effectiveness of the remedial alternatives for these sites. The following constants and criteria were used for estimation of remedial rates:

DRPH Reduction

No action or institutional controls and monitoring $k = 0.0025$/day
(Natural, unassisted bioremediation)

The k-value for no action and institutional controls and monitoring is based on rate data from a control cell in an experiment to measure the effectiveness of enhanced bioremediation (Liddell 1991). The case study k-value was decreased in an attempt to affect the bias that aeration of the control cell introduces.

Passive bioremediation $k = 0.008$/day

This rate is based on the rates found from observing a number of case studies. It represents the low end of the range of decay constants observed because many of the case studies took place under climatic conditions more favorable than those at Wainwright.

A comparison of the predicted degradation of DRPH using the bioremedial technologies being evaluated is illustrated in Figure 5-3.

The duration of onsite remedial activity and the total project duration are presented in Attachment B. These durations are defined as follows:

- Duration of onsite remedial activity includes all onsite activities related to conducting the remedial action: sampling, operating remedial equipment, two years of remedial activity, mobilization, and demobilization (this is a quantification of the relative duration estimate); and

- Total project duration includes the duration of onsite remedial activity, as well as time required for preparing planning documents, conducting permitting activities, and closure.

5.4.1.5 Data Gaps. Data gaps include any environmental testing or treatability studies that must be done to determine the effectiveness of a given remedial alternative under site conditions.

Alternatives are analyzed comparatively based on the AFCEE criteria above, and the nine criteria in the NCP. The preferred remedial alternatives are identified in Section 5.4.5.

5.4.2 Detailed Evaluation of Alternatives

This section presents a detailed evaluation of remedial alternatives for the two sites requiring remedial action at the Wainwright radar installation: Diesel Fuel Spills (SS04) and the Garage (SS07). Alternatives are developed by medium (e.g., the soil beneath the buildings) rather than by site. Table 5-6 summarizes the remedial alternatives evaluated in Sections 5.4.2.1 through 5.4.2.5.

5.4.2.1 Successful Applications of Alternatives.

No Action. As part of a study on in situ bioremediation of DRPH-contaminated gravel pads and soils near Prudhoe Bay, a control cell was left unassisted and untreated. This control cell represents, in essence, natural attenuation. Initial DRPH concentration was approximately 1,900 mg/kg. After nine weeks the DRPH concentration had decreased to 1,200 mg/kg. This indicates a reduction of 37 percent in DRPH concentration in 63 days. In addition, a slight increase in the microbial population was noted (Liddell et al. 1991). The difference between a control cell and undisturbed gravel is that the control cell material is oxygenated as it is placed in the cell. As a result, the rate and magnitude of reduction are probably greater than that for undisturbed soil or gravel.

TABLE 5-6. SUMMARY OF REMEDIAL ALTERNATIVES BY MEDIUM

MEDIUM	SITES	REMEDIAL ALTERNATIVES
Soils beneath building	Diesel Fuel Spills (SS04) Garage (SS07)	• No action • Institutional controls and monitoring • Containment • Passive bioremediation • Biosurfactants

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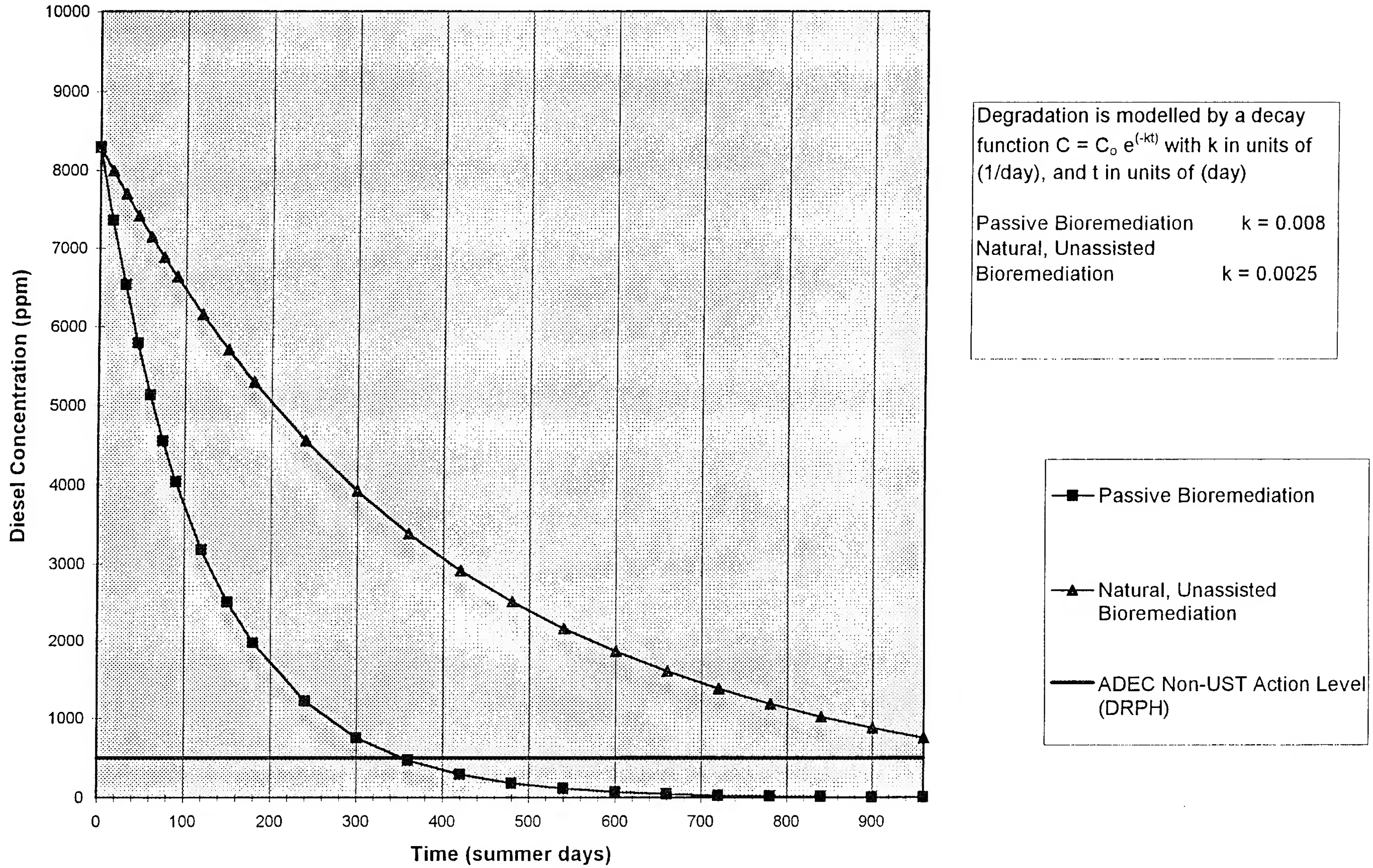
Figure 5-3. Comparative Biodegradation of Diesel Fuel in the Environment
(Basis: Maximum Diesel Concentration of 8,300 ppm Under Garage at Wainwright)



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Institutional Controls and Monitoring. The bioremediation study noted above applies to this remedial alternative.

Containment. Although there are no examples of maintaining freezing conditions to contain contaminants on the North Slope, the method has been developed as an innovative technology in the lower 48 states, and the low maintenance approaches of insulation and heat exchangers are routinely used in Alaska to protect the integrity of stilted structures by keeping the level of permafrost at or near the ground surface.

Passive Bioremediation. Passive bioremediation (i.e., through nutrient, lime, and moisture addition) has been successfully implemented in the arctic environment to treat petroleum hydrocarbon contamination on the North Slope. Studies at Point Thompson and Kuparuk oil fields in Alaska show that passive bioremediation is a successful and efficient method for remediating and reducing the concentration of petroleum hydrocarbons to a desired level within a relatively short time. The Point Thompson case study shows that 16,000 cubic yards of TPH contaminated gravel with an initial concentration of 2,000 to 3,000 ppm was bioremediated to an average concentration of 285 ppm between July and September 1990 (Liddell et al. 1991). None of the studies reviewed involved soils beneath buildings.

The estimated remedial action efficiency of passive bioremediation is 94 percent based on case studies done in Alaska and estimates of biodegradation kinetics.

Biosurfactants. Biosurfactants were used successfully to clean petroleum from rocks and underlying sands and soils in the Prince William Sound area in 1993 (Tesoro/PES 1993). They also were used successfully to remediate hydrocarbon contamination on rocks and soils at a refinery in Kenai, Alaska, in 1992 (Tesoro/PES 1992). Specific North Slope case studies have not been identified, but the site conditions, especially the shallow permafrost beneath the structures and existing drainage, should allow for collection of any materials introduced by this process. A wastewater discharge permit may be required.

The estimated remedial action efficiency for the in situ use of biosurfactants is 90 percent, based on the reduction found in a case study done at the Tesoro Kenai Refinery (Tesoro/PES 1992) and consideration of the uncertainty in this application of the technology. This efficiency should be possible under conditions found on the North Slope; however, a treatability test will be conducted to determine site-specific efficiency.

5.4.2.2 Project Costs. A summary of project costs for the remedial alternatives is included in Table 5-7. Detailed cost estimates for each remedial alternative are located in Attachment A.

5.4.2.3 Contaminant Reduction. The degree to which COCs will meet target cleanup levels (proposed remediation goals) for each alternative is summarized in Table 5-8. This measure is presented as post-remedial concentration, or the initial concentration of DRPH multiplied by one minus the projected efficiency. DRPH is selected because its concentration is much greater than the other COCs and, therefore, will drive the selection of the remedial alternative.

TABLE 5-7. SUMMARY OF PROJECT COSTS FOR REMEDIAL ACTION ALTERNATIVES FOR THE DIESEL FUEL SPILLS (SS04) AND THE GARAGE (SS07)

REMEDIAL ALTERNATIVE	TECHNOLOGY TESTING	CAPITAL COST	TOTAL LABOR	OPERATING COST	ENVIRONMENTAL TESTING	CLOSURE COST	ADMINISTRATIVE AND OTHER INDIRECT COSTS	PRESENT VALUE
No action	$0	$0	$0	$0	$0	$5,000	$750	$5,750
Institutional controls and monitoring	$0	$100	$29,320	$16,675	$1,040	$5,000	$13,865	$66,000
Containment	$0	$36,000	$71,760	$30,000	$0	$0	$20,665	$158,425
Passive bioremediation	$7,500	$2,585	$74,505	$40,875	$1,550	$4,320	$33,705	$165,040
Biosurfactants	$7,500	$10,555	$72,640	$39,825	$1,550	$6,480	$35,595	$174,145

TABLE 5-8. ESTIMATED POTENTIAL CONTAMINANT REDUCTION

ALTERNATIVE	MEDIUM	CONTAMINANTS	AVERAGE INITIAL CONCENTRATION OF DRPH (mg/kg)	PRG* CONCENTRATION FOR DRPH (mg/kg)	POST-REMEDIAL CONCENTRATION FOR DRPH (mg/kg)
No action	Soil beneath structures	DRPH, GRPH, RRPH, BTEX	6,600	500	3,330
Institutional control and monitoring	Soil beneath structures	DRPH, GRPH, RRPH, BTEX	6,600	500	3,300
Passive bioremediation	Soil beneath structures	DRPH, GRPH, RRPH, BTEX	6,600	500	396
Biosurfactants	Soil beneath structures	DRPH, GRPH, RRPH	6,600	500	660
Containment	Soil beneath structures	DRPH, GRPH, RRPH	6,600	500	6,600[a]

* PRG - Proposed remedial goal based on ADEC cleanup guidance levels (ADEC 1991).
a Containment involves no treatment, therefore, the post-remedial concentrations is unchanged. It is estimated to reduce mobility of COC by 90 percent.

5.4.2.4 Project Duration. A breakdown of the project durations for the remedial alternatives is shown in Table 5-9. Detailed project duration tables for each of the alternatives are located in Attachment B. Several assumptions are made concerning passive bioremediation based on case studies and best engineering judgement. Technology testing will be necessary for alternatives involving passive bioremediation to determine their feasibility under site-specific conditions and to provide information for detailed design. Technology testing is expected to take about 60 days. This should not affect the start of onsite remedial activities, provided that sufficient time is allowed for this to occur before other onsite activities begin.

5.4.2.5 Data Gaps. Data gaps are organized by remedial alternative. Remedial alternatives that apply to more than one medium are described only once because the data gaps are independent of medium.

No Action. The data gaps are the lack of information on site-specific biodegradation potential.

Institutional Controls and Monitoring. The data gaps are the lack of information on site-specific biodegradation potential.

Containment. The data gaps relate to design specifications including the most appropriate method for maintaining freezing conditions and the method for accessing the soil beneath the structures at the Diesel Fuel Spills (SS04) and Garage (SS07).

Passive Bioremediation. The data gap is the lack of information on site-specific biodegradation potential. A treatability study will be necessary to determine the biodegradation potential of contaminants. Several parameters must be investigated, including pH and baseline microbial activity. An additional parameter is the impact of the different degrees of vertical access of biodegration potential. The Diesel Fuel Spills is accessible and may be a better candidate for passive bioremediation than the Garage.

Biosurfactants. Effectiveness of the air knives and accessibility beneath the structures associated with the Diesel Fuel Spills (SS04) and Garage (SS07) are the data gaps. Clearance beneath the buildings is variable and sometimes less than two feet. A treatability study will be necessary to determine the effectiveness of the air knives. Several parameters must be investigated, including the degree to which the petroleum hydrocarbons have weathered.

5.4.3 Summary of Detailed Evaluation of Remedial Alternatives

Table 5-10 summarizes the remedial alternatives evaluated for the soil beneath the buildings. Costs presented in the tables are based on the unit cost developed for each remedial alternative for each site and the estimated volume of each contaminated medium.

5.4.4 Summary of the Nine Criteria

This section consists of an evaluation of the proposed alternatives. The alternatives are arranged by medium with reference to specific sites where it is appropriate, and are analyzed according to the following nine criteria required in the NCP:

TABLE 5-9. ESTIMATED PROJECT DURATION FOR REMEDIAL ACTION ALTERNATIVES FOR THE DIESEL FUEL SPILLS (SS04) AND THE GARAGE (SS07)

REMEDIAL ALTERNATIVE	DURATION OF ONSITE REMEDIAL ACTIVITY (Days)	TOTAL PROJECT DURATION (Days)
No action	0	30
Institutional controls and monitoring	11	881
Containment	22	119
Passive bioremediation	23	988
Biosurfactants	23	596

TABLE 5-10. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

ALTERNATIVE	MEDIUM	CONTAMINANTS	REMEDIAL ACTION EFFICIENCY FOR DRPH	AVERAGE INITIAL CONCENTRATION OF DRPH* (mg/kg)	TARGET CLEANUP LEVEL FOR DRPH (mg/kg)	POST REMEDIAL CONCENTRATION FOR DRPH (mg/kg)	BENCH OR TREATABILITY STUDY REQUIRED	LEVEL OF WORKER PROTECTION	PROJECT DURATION (Months)	PROJECT COST
No action	Soil beneath buildings	DRPH, GRPH, RRPH, BTEX	50%	6,600	500	3,300	NO	D	1	$5,750
Institutional controls and monitoring	Soil beneath buildings	DRPH, GRPH, RRPH, BTEX	50%	6,660	500	3,330	NO	D	29	$66,000
Containment	Soil beneath buildings	DRPH, GRPH, RRPH, BTEX	90% (reduction in mobility)	6,660	500	6,660	NO	C	4	$158,425
Passive bioremediation	Soil beneath buildings	DRPH, GRPH, RRPH, BTEX	94%	6,660	500	396	YES	D	33	$165,040
Biosurfactants	Soil beneath buildings	DRPH, GRPH, RRPH, BTEX	90%	6,660	500	660	YES	C	20	$174,145

* Based on maximum from individual sites.

- Overall protection of human health and the environment;
- Compliance with ARARs;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume through treatment;
- Short-term effectiveness;
- Implementability;
- Cost;
- State acceptance (not evaluated at this time); and
- Community acceptance (not evaluated at this time).

State and community acceptance cannot be evaluated at this time and will be based on comments on this RI/FS report.

The evaluation of the nine criteria is presented in Table 5-11. The following definitions of the nine criteria, taken from the EPA RI/FS Guidance Document and the NCP, are used.

Overall Protection of Human Health and the Environment. This criterion addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs. This criterion addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and/or provide grounds for invoking a waiver.

Long-term Effectiveness and Permanence. This criterion refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of Toxicity, Mobility, or Volume Through Treatment. This criterion is the anticipated performance of the treatment technologies a remedy may employ (reflects the anticipated performance of treatment).

Short-term Effectiveness. This criterion addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability. This criterion is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost. Cost includes estimated capital and operation and maintenance costs, and net present work costs.

State Acceptance. State acceptance addresses the technical or administrative issues and concerns the support agency may have regarding each alternative.

TABLE 5-11. EVALUATION OF NINE CRITERIA FOR THE DIESEL FUEL SPILLS (SS04 AND THE GARAGE (SS07)

CRITERIA	NO ACTION	INSTITUTIONAL CONTROLS AND MONITORING	CONTAINMENT	PASSIVE BIOREMEDIATION	BIOSURFACTANTS
1. Overall Protection of Human Health and the Environment	This alternative may not be completely protective of human health and the environment because it may not comply with all chemical-specific ARARs. Therefore, it may not provide sufficient long-term effectiveness and permanence.	This alternative may not be completely protective of human health and the environment because it may not comply with all chemical-specific ARARs. Therefore, it may not provide sufficient long-term effectiveness and permanence.	This alternative is protective of human health and the environment as a temporary measure as long as freezing conditions are maintained.	This alternative is protective of human health and the environment because it reduces the toxicity of COCs to acceptable levels of risk and hazard, provides long-term effectiveness and permanence, and provides short-term effectiveness though it may not comply with chemical-specific ARAR. It is more likely to be effective at the Diesel Fuel Spills (SS04) because of better vertical access for workers.	This alternative is protective of human health and the environment because it reduces the toxicity of COCs to acceptable levels of risk and hazard, provides long-term effectiveness and permanence, and provides short-term effectiveness.
2. Compliance with ARARs	The use of this technology will comply with action specific and location specific ARARs, but may not provide enough reduction to comply with chemical specific ARARs if unsupported bioremediation is unsuccessful.	The use of this technology will comply with action specific and location specific ARARs, but may not provide enough reduction to comply with chemical specific ARARs if unsupported bioremediation is unsuccessful.	This alternative complies with action-specific and location-specific ARARs. It does not comply with chemical-specific ARARs.	The use of this technology may not comply with all chemical specific, but does comply with action and location specific ARARs.	The use of this technology may not comply with all action specific, location specific, and chemical specific ARARs without permits.
3. Long-term Effectiveness and Permanence	This alternative may not provide long-term effectiveness because of uncertainties regarding bioremediation potential of gravel and the immobility of Aroclor 1254.	This alternative may not provide long-term effectiveness because of uncertainties regarding bioremediation potential.	This alternative does not provide long term effectiveness or permanence. It is intended to be a temporary measure.	This alternative provides sufficient long-term effectiveness because the residual COC concentrations are below relevant risk and hazard levels. It provides permanence because COCs are irreversibly transformed to non-hazardous by-products.	This alternative provides sufficient long-term effectiveness because the residual COC concentrations are below relevant risk and hazard levels. It provides permanence because COCs are removed physically and irreversibly transformed to non-hazardous by-products.
4. Reduction of Toxicity, Mobility, and Volume Through Treatment	Results in a reduction in toxicity through passive treatment.	Results in a reduction in toxicity through passive treatment.	Results in no reduction in toxicity through treatment.	Results in a reduction in toxicity through treatment.	Results in a reduction in toxicity through treatment.

TABLE 5-11. EVALUATION OF NINE CRITERIA FOR THE DIESEL FUEL SPILLS (SS04 AND THE GARAGE (SS07) (CONTINUED)

CRITERIA	NO ACTION	INSTITUTIONAL CONTROLS AND MONITORING	CONTAINMENT	PASSIVE BIOREMEDIATION	BIOSURFACTANTS
5. Short-Term Effectiveness	This alternative will not detrimentally effect the environment, the surrounding community, or workers.	This alternative will detrimentally effect the environment, the surrounding community, or workers. Recommended worker protection is level D.	This alternative will not detrimentally effect on the environment or surrounding area. Workers may be exposed to COCs and difficult working conditions beneath the Buildings.	This alternative will not detrimentally effect the environment, the surrounding community, or workers. Recommended worker protection is level D.	This alternative will not detrimentally effect the environment, the surrounding community, or workers. Recommended worker protection is level C since biosurfactants may act as an irritant.
6. Implementability	This alternative should be technically and administratively implementable, provided that the risk management decisions are acceptable to ADEC.	This alternative is technically and administratively implementable.	This alternative should be technically and administratively implementable.	Technical implementability will be determined by performing a treatability study. Administrative implementability issues include securing permit. Materials are readily available.	This alternative should be technically implementable if runoff can be collected. Administrative implementability issues include securing permits. Materials are readily available.
7. Cost	$5,750	$66,000	$158,425	$165,040	$174,145
8. State/Support Agency	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.
9. Community Acceptance	Community Relations Plan is being implemented and community concerns will be addressed in a responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in a responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in a responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in a responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in a responsiveness summary.

Community Acceptance. Community acceptance addresses the issues and concerns the public may have regarding each of the alternatives.

5.4.5 Preferred Alternatives

The selection of preferred alternatives is a general approach rather than a specific action because there are uncertainties regarding the effectiveness of the remedial alternatives in the unusual environmental of the North Slope, future land use, and availability and timing of funding to perform remedial actions. As a result, the alternatives identified in this report as preferred should not be considered the final word. Instead, they should be considered the best available approach pending treatability testing and remedial design.

The preferred alternatives and their estimated costs are listed below:

<u>Diesel Fuel Spills (SS04)</u>	
Passive bioremediation contingent on the treatability study. The next best alternative is containment until the building is removed.	$96,714
<u>Garage (SS07)</u>	
Passive bioremediation contingent on the treatability study. The next best alternative is containment until the building is removed.	<u>$ 68,327</u>
<u>Total</u>	$165,041

(Costs based on both sites being remediated concurrently)

The preferred alternative for remediation of the soil beneath the structures at the Diesel Fuel Spills (SS04) and Garage (SS07) is passive bioremediation based on the criteria for evaluation, in particular long and short term effectiveness, implementability, cost, and duration (Table 5-11). This alternative should meet the target guidance cleanup levels for DRPH, GRPH, and BTEX at less cost than in situ use of biosurfactants without adversely impacting human health and the environment. Further, passive bioremediation is more easily implemented than either in situ use of biosurfactants or containment.

The soil beneath the structures pose a difficult problem as long as the buildings remain in place. Some land use scenarios involve donating structures to indigenous Alaskans, so dismantling may not be an option at present. The alternative that is most likely to meet ADEC and public approval is some effort at actively reducing the contamination. Passive bioremediation, therefore, should be the preferred alternative, over containment, contingent on a successful treatability study. If passive bioremediation is not viable, the next best alternative is to contain the contaminants until the building is dismantled or a better remedial alternative is developed.

Because the relative costs of passive bioremediation, containment, and biosurfactants are similar, treatability studies could be conducted using the three alternatives in different areas below one DEW Line structure. Vertical access to the areas beneath the structures is limited and may limit the successful application of one or more of these alternatives. Based on the results of the treatability studies, the most successful alternative could be used below several DEW Line buildings that have similar contaminants.

5.5 SITING STUDY

Siting of remedial equipment should not be a major concern at Wainwright because no large remedial units are planned.

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ATTACHMENT A
COST ESTIMATES

Soil Under Buildings

Alternative: No Action

Estimated Costs

Sites:	Media:	Soil Under Buildings	
Diesel Fuel Spill (SS04	Total volume:	266 CY	
Garage (SS07)	Project duration:	0.08 yr	(30 days)
	Discount rate:	5% *	

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Total Capital Cost over the 0.08 Year Project				$0	$0
OPERATING COSTS:					
Closure	1	Event	$5,000.00	$5,000	
Total Capital Cost over the 0.08 Year Project				$5,000	$0
Total Capital Cost over the 0.08 Year Project				$5,000	$0
Procurement costs (0%)				$0	$0
Overhead (10%)				$500	$0
Contingency (5%)				$250	$0
Total Capital Cost over the 0.08 Year Project				$750	$0
NET PRESENT WORTH					**$5,750**

* Estimated discount rate for calculating present value of future costs

Alternative: Containment
Estimated Costs

Sites:	Media:	Soil Under Buildings	
Diesel Fuel Spill (SS04)	Total volume:	266 CY	
Garage (SS07)	Project duration:	0.33 yr	(119 days)
	Discount rate:	5% *	

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (RD/RA) (Work plan, SAP, QAPjP, H&S)	3	Report	$5,000.00	$15,000	
Insulation	3,000	Sq Ft	$2.00	$6,000	
Gravel Cover	100	Ton	$100.00	$10,000	
Miscellaneous Equipment (including Heat Exchangers)	1	LS	$5,000.00	$5,000	
Total Capital Cost over the 0.4 Year Project				$36,000	$0
OPERATING COSTS:					
Mobilization	1	Event	$30,000.00	$30,000	
Labor	696	Hr	$70.00	$48,720	
Per diem	72	Day	$175.00	$12,600	
Project Management	104	Hr	$100.00	$10,440	
Total Capital Cost over the 0.4 Year Project				$101,760	$0
Total Capital Cost over the 0.4 Year Project				$137,760	$0
Procurement costs (0%)				$0	$0
Overhead (10%)				$13,776	$0
Contingency (5%)				$6,888	$0
Total Capital Cost over the 0.4 Year Project				$20,664	$0
NET PRESENT WORTH					$158,424

* Estimated discount rate for calculating present value of future costs

Alternative: Institutional Controls and Monitoring
Estimated Costs

Site:	Media:	Soil Under Buildings
Diesel Fuel Spill (SS04)	Total volume:	266 CY
Garage (SS07)	Project duration:	3 yr (881 days)
	Discount rate:	5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (Work plan, SAP, QAPjP, H&S)	2	Report	$5,000.00	$10,000	
Misc. Equipment and Supplies	1	Lump Sum	$100.00	$100	
Total Capital Cost over the 3 Year Project				$10,100	$0
OPERATING COSTS:					
Implement Institutional Controls	1	Event	$10,000.00	$10,000	
Sampling	3	Event	$560.00		$1,680
Labor	240	Hr	$70.00	$16,800	
Per Diem	26	Days	$175.00	$4,550	
Project Management	36	Hr	$70.00	$2,520	
Closure (Year 3)	1	Report	$5,000.00	$5,000	
Travel for Sampling	4	Trips	$1,200.00		$4,800
Total Operating Cost over the 3 Year Project				$38,870	$6,480
Total Direct Cost over the 3 Year Project				$48,970	$6,480
Procurement costs (5%)				$2,449	$324
Overhead (10%)				$4,897	$648
Contingency (10%)				$4,897	$648
Total Administrative Cost over the 3 Year Project				$12,243	$1,620
NET PRESENT WORTH					**$65,999**

* Estimated discount rate for calculating present value of future costs

Alternative: Passive Bioremediation
Estimated Costs

Sites:	Media:	Soil Under Buildings	
Diesel Fuel Spill (SS04)	Total volume:	266 CY	
Garage (SS07)	Project duration:	3 yr	(988 days)
	Discount rate:	5% *	

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (RD/RA) (Work plan, SAP, QAPjP, H&S)	3	Report	$5,000.00	$15,000	
Develop Specifications (30%, 95%, 100%)	3	Report	$5,000.00	$15,000	
Permitting (Air or Water)	1	Permit	$2,000.00	$2,000	
Treatability study	1	Study	$7,500.00	$7,500	
Nutrients	106	Lb	$1.00	$106	
Empty sand bags	14	Bag	$0.47	$7	
Hose	1	Hose	$50.00	$50	
Booms	5	Boom	$24.53	$123	
Trash pump	2	Month	$420.00	$840	
Personal H & S Expendibles	46	Day	$10.00	$460	
Misc. Equipment and Supplies	1	Lump Sum	$1,000.00	$1,000	
Total Capital Cost over the 3 Year Project				$42,086	$0
OPERATING COSTS:					
Mobilize/Demobilize	1	Event	$30,000.00	$30,000	
Transport Nutrients					
Transport Equipment					
Labor	528	Hr	$70.00	$36,960	
Per diem	50	Day	$175.00	$8,750	
Sampling & Analysis (initial)	8	Sample	$70.00	$560	
Sampling & Analysis (annual)	2	Event	$560.00		$1,120
Travel for Sampling	4	Trips	$1,200.00		$4,800
Project Management	79	Hr	$70.00	$5,544	
Closure (Year 3)	1	Report	$5,000.00		$5,000
Total Operating Cost over the 3 Year Project				$81,814	$10,920
Total Direct Cost over the 3 Year Project				$123,900	$10,920
Procurement costs (5%)				$6,195	$546
Overhead (10%)				$12,390	$1,092
Contingency (10%)				$12,390	$1,092
Total Administrative Cost over the 3 Year Project				$30,975	$2,730
NET PRESENT WORTH					**$165,040**

* Estimated discount rate for calculating present value of future costs

Alternative: Biosurfactants
Estimated Costs

Sites:	Media:	Soil Under Building
Diesel Fuel Spill (SS04)	Total volume:	266 CY
Garage (SS07)	Project duration:	2 yr (596 days)
	Discount rate:	5% *

Description	Quantit	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (RD/RA) (Work plan, SAP, QAPjP, H&S)	3	Report	$5,000.00	$15,000	
Develop Specifications (30%, 95%, 100%)	3	Report	$5,000.00	$15,000	
Permitting (Air & Water)	2	Permit	$2,000.00	$4,000	
Treatability study	1	Study	$7,500.00	$7,500	
Air Knife Purchase (pair)	1	Pair	$6,000.00	$6,000	
Compressor	1	Month	$2,000.00	$2,000	
Microbes	0	Gal	$20.90	$0	
Nutrients	106	Lb	$1.00	$106	
Empty sand bags	15	Bag	$0.47	$7	
Hose	500	LF	$1.00	$500	
Booms	5	Boom	$24.53	$123	
Trash pump	1	Month	$420.00	$420	
Personal H & S Expendibles	40	Day	$10.00	$400	
Misc. Equipment and Supplies	1	Lump Sum	$1,000.00	$1,000	
Total Capital Cost over the 2 Year Project				$52,056	$0
OPERATING COSTS:					
Mobilization	1	Event	$30,000.00	$30,000	
Transport Microbes					
Transport Nutrients					
Transport Equipment					
Labor	480	Hr	$70.00	$33,600	
Per diem	44	Day	$175.00	$7,700	
Sampling & Analysis (initial)	8	Sample	$70.00	$560	
Sampling & Analysis (annual)	2	Event	$560.00		$1,120
Travel for Sampling	4	Trips	$1,200.00		$4,800
Project Management	72	Hr	$70.00	$5,040	
Closure (Year 2)	1	Report	$7,500.00		$7,500
Total Operating Cost over the 2 Year Project				$76,900	$13,420
Total Direct Cost over the 2 Year Project				$128,956	$13,420
Procurement costs (5%)				$6,448	$671
Overhead (10%)				$12,896	$1,342
Contingency (10%)				$12,896	$1,342
Total Administrative Cost over the 2 Year Project				$32,239	$3,355
NET PRESENT WORTH					**$174,146**

* Estimated discount rate for calculating present value of future costs

ATTACHMENT B
ESTIMATED PROJECT DURATIONS

Soil Under Buildings

Alternative: No Action
Estimated Project Duration

Sites:
Diesel Fuel Spill (SS04)
Garage (SS07)

Start Date: Day 1
Medium: Soil Under Buildings

Activity	Duration	Start Date	End Date
Development of Closure Report	30 Days	Day 1	Day 30
Closure	0 Days	Day 30	Day 30
PROJECT DURATION	30 Days		

Alternative: Containment
Estimated Project Duration

Sites:
Diesel Fuel Spill (SS04)
Garage (SS07)

Start Date: Day 1
Medium: Soil Under Buildings

Activity	Duration	Start Date	End Date
Development of Planning Documents	90 Days	Day 1	Day 90
Mobilization	7 Days	Day 91	Day 97
Installation of Containment	15 Days	Day 98	Day 112
Demobilization	7 Days	Day 113	Day 119
PROJECT DURATION	119 Days		

Alternative: Institutional Controls and Monitoring
Estimated Project Duration

Site:
Diesel Fuel Spill (SS04)
Garage (SS07)

Start Date: Day 1
Medium: Soil Under Buildings

Activity	Duration	Start Date	End Date
Development of Planning Documents	60 Days	Day 1	Day 60
Implementation of Institutional Controls	60 Days	Day 61	Day 120
Mobilization	2 Days	Day 121	Day 122
Preliminary Sampling	3 Days	Day 123	Day 125
Demobilization	2 Days	Day 126	Day 127
End of First Year Sampling	3 Days	Day 487	Day 489
End of Second Year Sampling	3 Days	Day 849	Day 851
Development of Closure Report	30 Days	Day 852	Day 881
Closure	0 Days	Day 881	Day 881
PROJECT DURATION	881 Days		

Alternative: Passive Bioremediation
Estimated Project Duration

Sites:
Diesel Fuel Spill (SS04) Start Date: Day 1
Garage (SS07) Media: Soil Under Buildings

Activity	Duration	Start Date	End Date
Treatability Study	60 Days	Day 1	Day 60
Development of Planning Documents	90 Days	Day 61	Day 150
Development of Specifications	60 Days	Day 61	Day 120
Permits	60 Days	Day 151	Day 210
Mobilization	7 Days	Day 211	Day 217
Preliminary Sampling	3 Days	Day 218	Day 220
Application of Nutrients, Microbes, and Water	7 Days	Day 221	Day 227
Demobilization	7 Days	Day 228	Day 234
End of First Year Sampling	3 Days	Day 594	Day 596
End of Second Year Sampling	3 Days	Day 956	Day 958
Development of Closure Report	30 Days	Day 959	Day 988
Closure	0 Days	Day 988	Day 988
PROJECT DURATION	988 Days		

Alternative: Biosurfactants
Estimated Project Duration

Sites:
Diesel Fuel Spill (SS04)
Garage (SS07)

Start Date: Day 1
Media: Soil Under Building

Activity	Duration	Start Date	End Date
Treatability Study	60 Days	Day 1	Day 60
Development of Planning Documents	90 Days	Day 61	Day 150
Development of Specifications	60 Days	Day 61	Day 120
Permits	60 Days	Day 151	Day 210
Mobilization	7 Days	Day 211	Day 217
Preliminary Sampling	3 Days	Day 218	Day 220
Application of Biosurfactant to soil and Requisite Nutrients to Tank of Collected Water	7 Days	Day 221	Day 227
Demobilization	7 Days	Day 228	Day 234
End of First Year Sampling	3 Days	Day 594	Day 596
Closure	0 Days	Day 596	Day 596
PROJECT DURATION	596 Days		

APPENDIX A

REFERENCES AND LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASUREMENT

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Woodward-Clyde Consultants. 1987. Technical Support Document for Record of Decision, LIZ-3 DEW Line Site. Final Report.

LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASUREMENT

ACLs	Alternative Cleanup Levels
ADEC	Alaska Department of Environmental Conservation
AFCEE	Air Force Center for Environmental Excellence
Air Force	United States Air Force
ARARs	Applicable or Relevant and Appropriate Requirements
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CIP	Capitol Improvement Projects
COC	Chain-of-Custody or Chemical of Concern
CT&E	Commercial Testing & Engineering Co.
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DEW	Distant Early Warning
DFA	Diesel Fuel Arctic
DOD	Department of Defense
DRO	Diesel Range Organics
DRPH	Diesel Range Petroleum Hydrocarbons
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
F&B	Friedman & Bruya, Inc.
FS	Feasibility Study
FWPCA	Federal Water Pollution Control Act
GC/MS	Gas Chromatography/Mass Spectrometry
GRAs	General Response Actions
GRO	Gasoline Range Organics
GRPH	Gasoline Range Petroleum Hydrocarbons
HQ	Hazard Quotient
HVOC	Halogenated Volatile Organic Compound
ICP	Inductively Coupled Plasma
IRP	Installation Restoration Program
MOGAS	Motor Vehicle Gasoline
MSL	Mean Sea Level
NCP	National Contingency Plan

LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASUREMENT (CONTINUED)

NFA	No Further Action
NPRA	National Petroleum Reserve in Alaska
NSB	North Slope Borough
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene
QA	Quality Assurance
QC	Quality Control
QAPjP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RBSLs	Risk-Based Screening Levels
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RI/FS	Remedial Investigation/Feasibility Study
RI	Remedial Investigation
RRPH	Residual Range Petroleum Hydrocarbon
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SOPs	Standard Operating Procedures
SRR	Short Range Radar
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TOC	Total Organic Carbon
TRVs	Toxicity Reference Values
TSS	Total Suspended Solids
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compound

LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASUREMENT (CONTINUED)

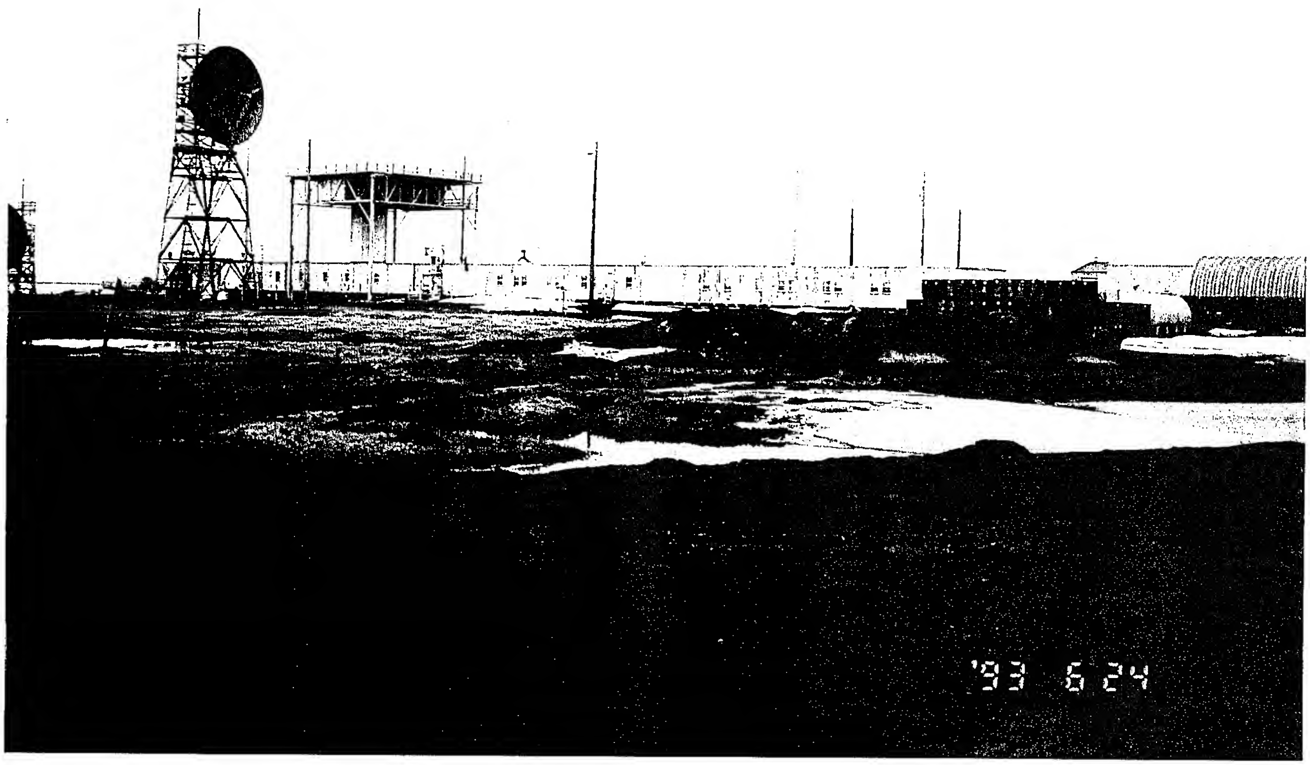
MEASUREMENTS

μg/L	micrograms per liter
cy	cubic yards
gpm	gallons per minute
mg/kg	milligrams per kilogram
ppb	parts per billion
ppm	parts per million

APPENDIX B

PHOTOGRAPHS OF WAINWRIGHT RADAR INSTALLATION AND SITES

A view to the northwest of the Wainwright radar installation in May.

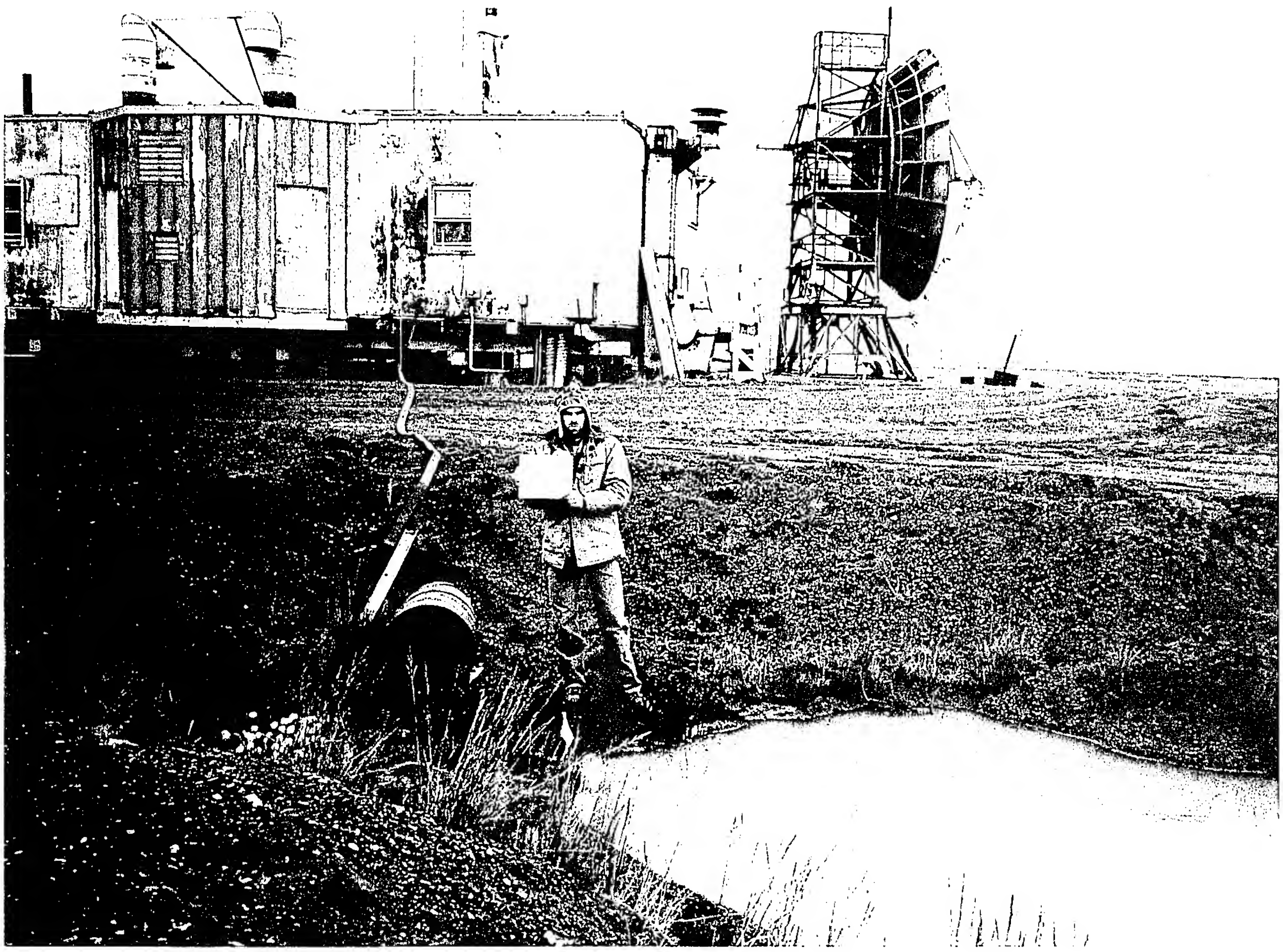


A view to the northwest of the module train and radome at the Wainwright radar installation in June.

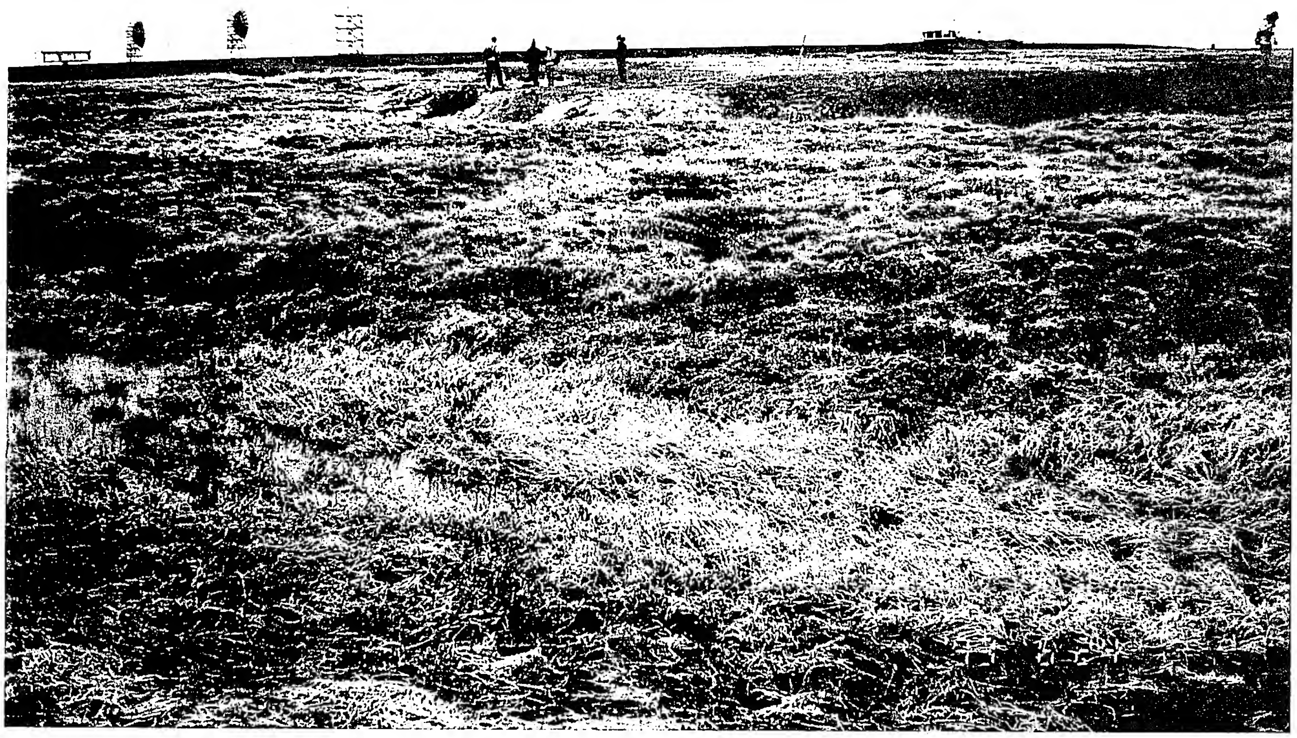
This is a view to the west of the Wainwright radar installation in September.

A view to the south of the Drum Storage Area (ST02). A burn pit can be seen in the bottom right of the photo. The drums presently are empty, however, a few contain rainwater.

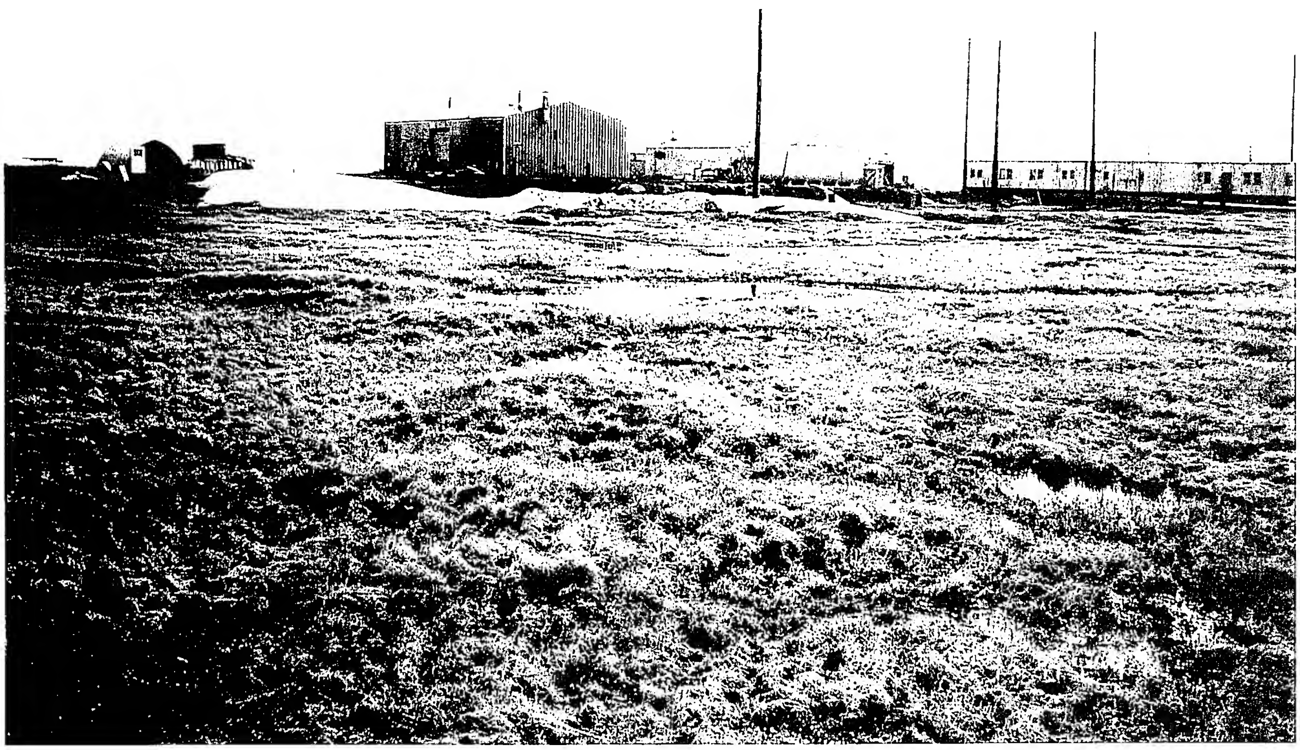
This is the Diesel Fuel Spills (SS04) site as viewed to the east. The two spills occurred in the early and mid 1970s at this site.



A view to the southeast of the Diesel Fuel Spills (SS04). The two 10,000-gallon fuel spills occurred at the west end of the module train.

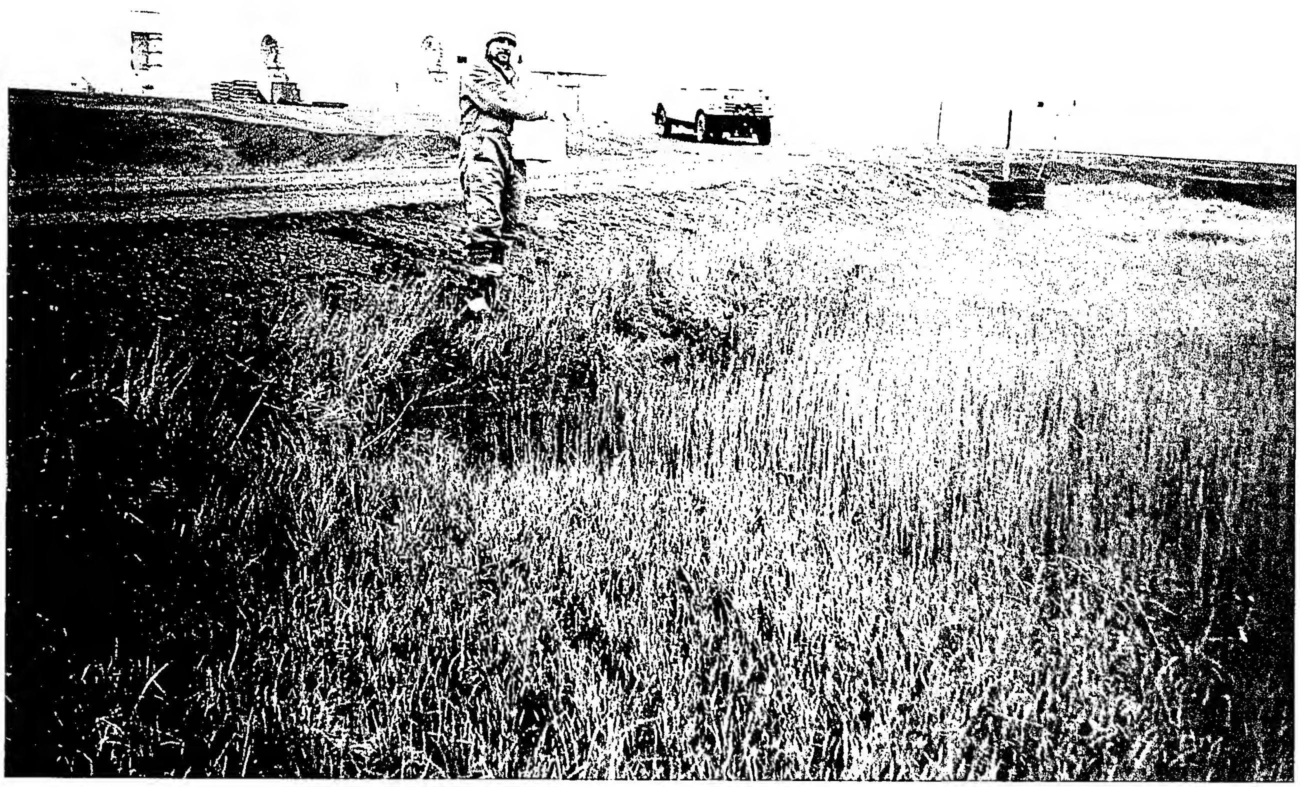


The Landfill (LF05) was active from approximately 1974 to 1989. This view is to the north.

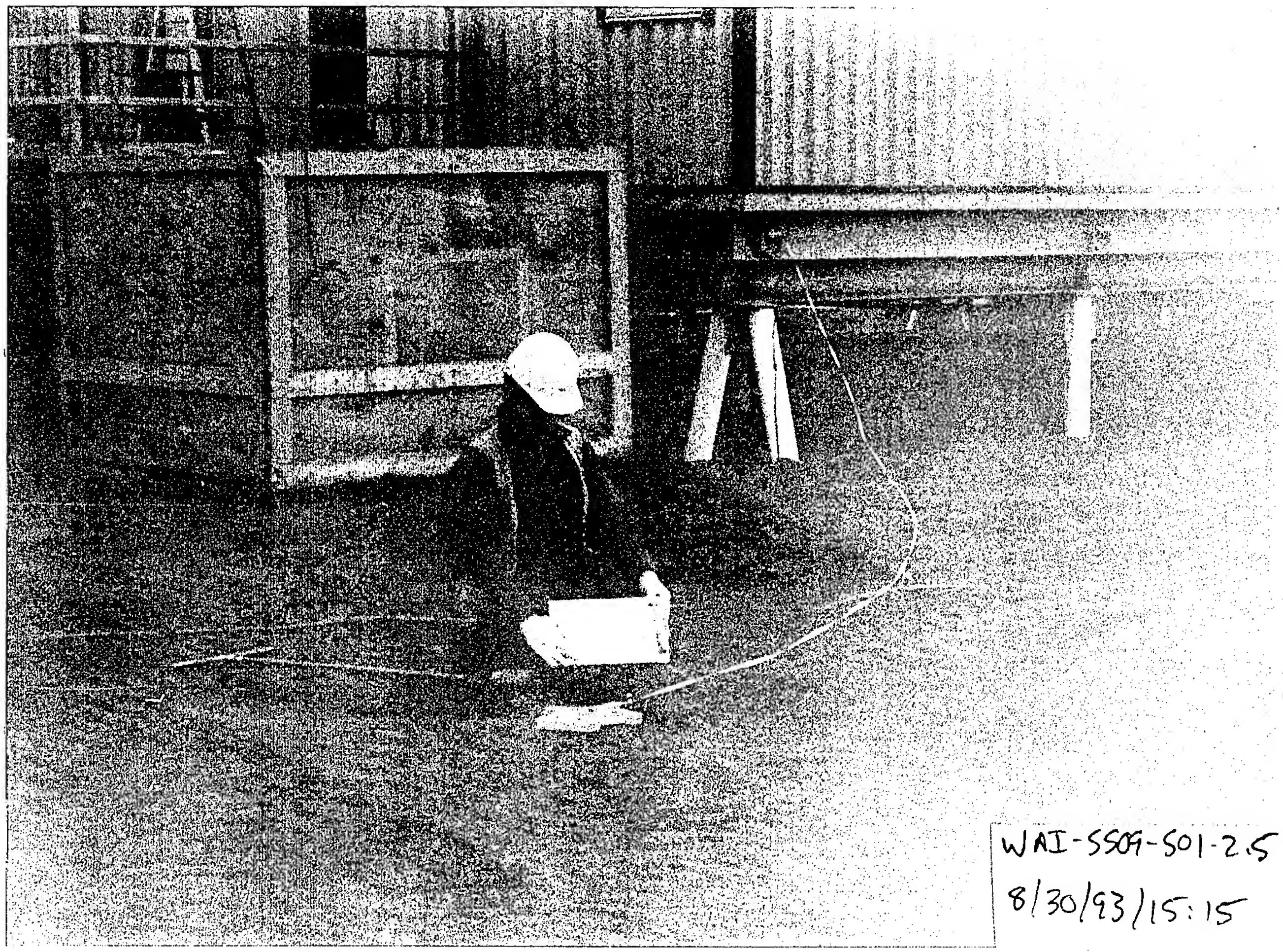


This is a view to the southeast of the Garage (SS07) site.

Culverts lead from under the Garage (SS07) to both the east and west. This view of the Garage is to the southwest.



The Airstrip Diesel (SS08) site is located near the airstrip, next to the southernmost portion of the road from Fresh Water Lake. This view is to the south.



A view to the east of the Vehicle Storage Area (SS09). A new technical services building can be seen in the background.

APPENDIX C

COPY OF THE TASK DESCRIPTIONS AND STATEMENT OF WORK

3 ORDER FOR SUPPLIES OR SERVICES 88X

1. PAGE 1 OF 3

2. PROC INSTRUMENT ID NUMBER (PIN): F33615-90-D-4010
MARK ALL PACKAGES AND PAPERS WITH THIS NUMBER
3. CALL/ORDER NUMBER: 0022
4. DATE OF ORDER*: 8 APR 1993
5. REQUISITION/PURCHASE REQUEST PROJECT NUMBER: FY7624-93-08202
6. CERTIFIED FOR NATIONAL DEFENSE UNDER DO-C9 BDC REG 2/DMS REG 1 RATING

7. ISSUED BY CODE FQ2826
DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
11 HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB TX 78235-5353
BUYER: EDWIN CUSTODIO/HSC-PKVBA
PHONE: (210) 536-4493

8. ADMINISTERED BY CODE S2101A
DCASMA BALTIMORE
200 TOWSONTOWN BLVD, WEST
TOWSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE
ICF TECHNOLOGY, INC
9300 LEE HIGHWAY
FAIRFAX VA 22031-1207
21 PHONE: (703) 934-3000
COUNTY: FAIRFAX

IF "S" FOR MULTIPLE FACILITIES SEE SECT "G"

10. MAIL INVOICES TO: U

11. DISCOUNT FOR PROMPT PAYMENT

	%	DAYS	NET DAYS
1ST N	%	DAYS	
2ND	%	DAYS	OTHER
3RD	%	DAYS	"Y" SEE SECT "G"

12A. PURCHASE OFFICE POINT OF CONTACT: MVH/M6V/MVY

12B. RESERVED FOR SERVICE/AGENCY USE

13. PAYMENT WILL BE MADE BY CODE S3910A IF "S" SEE SECT "G"
31 DCASR, PHILADELPHIA
P.O. BOX 7730
PHILADELPHIA, PA 19101-7478

14. TYPE CONTRACTOR: A
15. SECURITY A. CLASSIFICATION: U B. DATE OF DD 254

16. CONTRACT ADMINISTRATION
A. FAST PAY | B. CONTRACT (1) KIND (2) TYPE: I Y | C. ABSTRACT RECIP ADP POINT | D. SPL CONT PROVISIONS | E. CONT ADMIN FUNC LMT
17. (RESERVED)
18. SVC/AGENCY USE
19. SURV. CRIT: C
20. TOTAL AMOUNT: NOT-TO-EXCEED $299,855.00

21. APPROPRIATION AND ACCOUNTING DATA
A. ENTY CLAS: U B. ACRN: AA C. APPROPRIATION: 5733400 D. LIMIT SUBHEAD
E. SUPPLEMENTAL ACCOUNTING CLASSIFICATION: 303 7434 434419 00007 53440 78008F 674400
F. OPN RECIPIENT DODAAD: F74400 G. OBLIGATION AMOUNT: $299,855.00
H. NON-DOD PAYMENT/ID I. SVC AGENCY USE: FY7624-93-08202

41 22A. TYPE OF ORDER
DELIVERY X
B. NON-DOD CONTRACT NUMBER
This delivery order is subject to instructions contained on this side of form only and is issued in accordance with and subject to terms and conditions of above numbered contract, or Non-DOD Contract Number.
PURCHASE Reference your
Furnish the following on terms specified herein.

If quantity accepted by the Government is same as quantity ordered, indicate by mark. If different enter actual quantity accepted below quantity ordered and encircle.

23. UNITED STATES OF AMERICA
GARY J. MACDECKY 93APR08
BY: NAME OF CONTRACTING/ORDERING OFFICER AND DATE (YYMMDD)

24. TOTAL
25. DIFFERENCES
51 26. QUANTITY ORDERED HAS BEEN ☐ INSPECTED ☐ RECEIVED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS STATED
DATE SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE
26. SHIP NUMBER ☐ PARTIAL ☐ FINAL
27. D.O. VOUCHER NUMBER
28. INITIALS
31. PAID BY
32. AMOUNT VERIFIED CORRECT FOR
36. I CERTIFY THIS AMOUNT IS CORRECT AND PROPER FOR PAYMENT
SIGNATURE AND TITLE OF CERTIFYING OFFICER
30. PAYMENT ☐ COMPLETE ☐ PARTIAL ☐ FINAL
33. CHECK NUMBER
34. BILL OF LADING NUMBER
RECEIVED AT | 37. RECEIVED BY | 38. DATE RECEIVED | 39. TOTAL CONTAINERS | 40. S/R ACCOUNT NUMBER | 41. S/R VOUCHER NUMBER

AFSC Form 700, DEC 89 PREVIOUS EDITION IS OBSOLETE
*When used as a formal contract this will be the effective date.

REFERENCE AF FORM 616 H93SR232 (Change #1), DATED: 23 MAR 93

1. In accordance with the provisions of the Basic Contract F33615-90-D-4010 and this Delivery Order 0022, the contractor shall accomplish the effort described in the Statement of Work (SOW) dated 16 MAR 93 attached hereto at a total ceiling price of $299,855.00.

2. As a result of paragraph 1 above, the subject order is more specifically modified as set forth below:

SECTION B - THE SCHEDULE:

Item No	Supplies/Services	Quantity Purch Unit	Unit Price Total Item Amt
0001	CLIN sec class: U	1 LO	N N
0002	CLIN sec class: U	1 LO	N N

0001 CLIN sec class: U

noun: SAMPLING, ANALYSIS AND DATA
acrn: AA nsn: N
site codes pqa: D acp: D fob: D
pr/mipr data: FY7624-93-08202
type contract: Y

descriptive data:
Conduct work in accordance with the Statement of Work (SOW) of this order, dated 16 MAR 93 and Section C, The Description/Specifications of the Basic contract. Submit data in accordance with Attachment #1, the Contract Data Requirements List (CDRL) of the basic contract as implemented by paragraph VI of this order's SOW dated 16 MAR 93.

0002 CLIN sec class: U

noun: SUPPORT
acrn: AA nsn: N
site codes pqa: D acp: D fob: D
pr/mipr data: FY7624-93-08202
type contract: Y

descriptive data:
Provide support in accordance with the Statement of Work (SOW) of this order, dated 16 MAR 93 and Section C, The Description/Specification of the basic contract.

3. SECTION C - Description/Specification: - See attached Statement of Work entitled "Installation Restoration Program/Remedial Investigation/Feasibility Study for Distant Early Warning (DEW) line Sites, AK (Barter Island AFS (BAR-M), Bullen Point AFS (POW-3), Point Lonely AFS (POW-1), Point Barrow AFS (POW-M), Point Lay AFS (LIZ-2), Wainwright AFS (LIZ-3), and Oliktok Point AFS (POW-2)" dated 16 MAR 93.

4. SECTION F - Schedule Data:

Item No	Supplies Schedule Data	Delivery Quantity	Schedule Date
0001	CLIN Del Sch acrn: AA ship to: U sec class: U descriptive data: Technical effort shall be completed in accordance with the Statement of Work (SOW) dated 16 MAR 93. All data shall be delivered in accordance with Attachment #1 of the basic contract as implemented by paragraph VI of the Statement of Work dated 16 MAR 93. The data shall be accepted by the Government not later than 31 DEC 93.	1	93DEC31
0002	CLIN Del Sch acrn: AA ship to: U sec class: U descriptive data: Technical effort shall be completed in accordance with the Contract Data Requirements List (Attachment #1) of the basic contract as implemented by paragraph VI of the Statement of Work.	1	93DEC31

1993 March 16

STATEMENT OF WORK
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

STAGE 1

DISTANT EARLY WARNING (DEW) LINE SITES and CAPE LISBURNE AFS, AK

I. **DESCRIPTION OF WORK**

1.1 **Scope**

1.1.1 **Background.** The objective of the Air Force Installation Restoration Program (IRP) is to assess past hazardous waste disposal and spill sites on Air Force installations and develop remedial actions consistent with the National Contingency Plan (NCP) for those sites which pose a threat to human health and welfare or the environment. This objective is achieved through a Remedial Investigation Feasibility Study (RI/FS) process in which conclusions and recommendations drawn from accurate and validated data are used to structure and guide subsequent activities.

The RI/FS process includes scoping to define data requirements and objectives, a remedial investigation to characterize sites for a baseline risk assessment, and a feasibility study to define and evaluate alternative remedial actions so that a recommended action may be selected. Each of these steps of the RI/FS process can be conducted in stages that focus on particular aspects of the process.

The contractor shall accomplish the actions described in this Statement of Work (SOW) to complete the RI/FS process at the following seven Dew Line Sites and Cape Lisburne:

Barter Island AFS (BAR-M); Bullen Point AFS (POW-3); Point Lonely AFS (POW-1); Point Barrow AFS (POW-M); Point Lay AFS (LIZ-2); Wainwright AFS (LIZ-3); and Oliktok Point AFS (POW-2).

1.1.2 **Requirements for Project Activities.** The Installation Restoration Program (IRP) Handbook referenced in this Statement of Work provides requirements for laboratory and field activities and applicable formats for project documents that shall be used by the contractor. Volume 1 of the Handbook dated May 1992 is provided under separate cover. This document is referenced in this Statement of Work as the Handbook. The contractor is responsible for the thorough knowledge and understanding of the previous findings and recommendations that affect this task prior to the start of field activities. The documents involved include but are not limited to the IRP Phase I Records Search, and the IRP Phase II plans and reports addressing the Dew Line Sites and Cape Lisburne.

1.1.3 **Meetings.** A maximum of two (2) contractor personnel, including the project leader, shall attend four (4) meetings at Elmendorf AFB, AK. Each meeting shall be two (2) 8-hour workdays in duration. All meetings shall be coordinated by the TPM .

1.1.4 **Special Notifications.** The contractor shall immediately report to the TPM, or designate, via telephone, any data or results generated during this investigation which may indicate an imminent health risk. Following this telephone notification, a written notice shall be prepared and

delivered within three (3) days. This notification shall include supporting documentation (sequence 16, para 6.1)

1.2 Project Scoping Documents

The purpose of the project scoping documents is to clearly and comprehensively define project activities prior to the initiation of field work. The contractor shall prepare and submit the following project scoping documents for this task prior to the initiation of any field activities or laboratory analyses.

1.2.1 **Engineering Network Analysis.** Provide within ten (10) days after the issuance of an order a computer generated network analysis which is a detailed task plan for the RI/FS work efforts. The network analysis (GANTT) chart shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The network analysis (GANTT) shall show both serial and parallel subtasks leading to a deliverable product or report, and shall show early and late start and completion dates with float. The network analysis (GANTT) shall be updated and submitted quarterly (sequence 3, para 6.1).

1.2.2 **Work Plan.** This section will discuss the overall approach, (including a brief summary of the Conceptual Site Model and Data Quality Objectives), major tasks, scope, timeline, and major decision points. Due to the extreme remoteness of the Dew Line Sites and Cape Lisburne, the contractor shall include a detailed plan for logistics and strategy to complete the RI/FS field activities. Follow the format specified in section 1 of the Handbook. In preparing the Work Plan, use previous reports and the information gathered during the literature search and presurvey along with experience at similar sites. Reevaluate the recommendations for Dew Line Sites and Cape Lisburne developed during previous IRP stages (sequence 4, para 6.1).

1.2.3 **Sampling and Analysis Plan (SAP).** The SAP consists of a quality assurance plan (QAPP) and a Field Sampling Plan (FSP). Prepare a SAP describing how project activities will be accomplished in the format specified in section 1 of the Handbook. Incorporate review comments and obtain TPM concurrence prior to the start of field activities (sequence 4, para 6.1).

1.2.4 **Health and Safety Plan (HSP).** Provide a written Health and Safety Plan within eight (8) weeks after the issuance of an order. The contractor shall comply with USAF, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Health and Safety Plan shall provide no less protection than the protection contained in the manual entitled 'Health and Safety Requirements for Employees Engaged in Field Activities' dated 1981 and the 'Occupational Safety and Health Manual for Hazardous Waste Sites Activities' dated 1985 and 29 CFR 1910. Coordinate the Health and Safety Plan directly with applicable regulatory agencies prior to submittal to AFCEE/ESR. The contractor shall certify to AFCEE/ESR that the contractor has reviewed the coordinated Health and Safety Plan with each employee and also subcontractor's employees prior to the time each employee engages in field activities (sequence 4, para 6.1).

1.2.5 **Community Relations Plan.** The contractor shall prepare a Community Relations Plan (CRP) for the DEW Line Sites and Cape Lisburne AFS outlining the specific public communications and involvement techniques to be used in coordination with remedial site activities (sequence 4, para 6.1). Follow the guidance contained in 'Community Relations in Superfund, a Handbook', office of Solid Waste and Emergency Response (OSWER) Directive

9230.0-03C (EPA/540/R-92/009, January 1992, PB92-963341), and other applicable directives. Also, use as a guidance previously accomplished CRP from other installations in Alaska. Appropriately adapt such guidance to the local situation at the DEW Line Sites and Cape Lisburne. As described in OSWER Directive 9230.0-03C, the CRP shall include, but not be limited to, a description of the sites and the community, an overview of the community involvement to date, key community concerns regarding the site and AF site activities, and suggested community relations activities. A contact list of elected officials, agency representatives, and interested groups and individuals shall be included in appropriate copies of the plan. In addition, the plan will include suggested locations for meetings and information repositories. Contractor activities to develop the CRP shall include conducting a review of site information provided by the AF.

1.3 Project Activities

The contractor shall conduct the following tasks to achieve the purposes stated herein, in compliance with approved scoping documents, the Handbook, and all applicable regulations and requirements.

1.3.1 Community Relations. Provide support to the base public affairs office for the tasks described below pertaining to the RI/FS Community Relations Program.

1.3.1.1 Public meetings and workshops. The contractor shall be responsible for coordinating public meetings and workshops for all DEW Line Sites and Cape Lisburne AFS. This includes producing briefing scripts, slides and any associated products such as response cards and sign-in sheets. As requested by the base Community Relations office in coordination with the TPM, research and provide materials for public queries, news media queries, and news releases. Assume a maximum of one (1) workshop/meeting (Seq. nos. 3,9).

1.3.1.2 Public notices. As required by the base Community Relations office and the TPM, the contractor shall prepare and publish public notices for the Fairbanks and local newspapers. The purpose of these notices is to inform the public of a meeting, workshop, or comment period in which they have the opportunity to be involved in the IRP Program at DEW Line Sites and Cape Lisburne AFS. Also, these notices may be utilized to inform the public of other pertinent program information such as quarterly notices of documents placed in the information repositories. The format for the notices shall be coordinated with the Community Relations office and TPM, and then submitted to the TPM for review prior to delivery to the base. Assume a maximum of two (2) notices (Seq. no. 3).

1.3.1.3 Photo Notebook The contractor shall develop a photo notebook which focuses on the overall IRP program at DEW Line Sites and Cape Lisburne AFS. The layout of the notebook will be coordinated with the public affairs office and TPM. Assume a maximum of one (1) update (Seq. no. 9).

1.3.1.4 Mailing List. In coordination with the base Community Relations office and the TPM, prepare and update the mailing list on a quarterly basis. Assume a maximum of two (2) updates (Seq. no. 3).

1.3.1.5 Maps. Prepare presentation quality maps of the installations and their sites to use in newsletters and to distribute to the public.

1.3.2 Literature Search. Conduct a literature search and analyze aerial photos of the DEW Line Sties to supplement existing information that has been collected. The purpose of the literature search is to complete the

conceptual site model so that a numerical estimate of risk can be developed.

1.3.3 **Presurvey.** Within eight weeks of the issuance of an order, the contractor shall visit the Dew Line Sites and Cape Lisburne to ensure complete understanding of site conditions. Coordinate this visit with the TPM and the 11 CEOS project manager. The contractor shall look for evidence of contamination at each site visited (e.g., leaking drums, vegetative stress, leachate seeps). The contractor shall observe the physical settings of each site visited to formulate specific recommendations concerning boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. The findings of the presurvey shall be used to prepare the Work Plan, SAP, and HSP for the RI and to prepare scoping documents for the treatability study(ies). Assume one presurvey and one reconnaisance trips.

1.3.4 **Quality Assurance/Quality Control (QA/QC).** A QA/QC program shall be conducted and documented for all work pursuant to this delivery order. Contractor and project-specific documents concerning QA/QC procedures and requirements shall be strictly followed. Data generated under the QA/QC program shall be used by the contractor for evaluating the analytical results and field records assembled for each site to identify accurate and validated data that may be used to assess risk, develop conceptual site models and evaluate alternatives.

1.3.5 **Conceptual Site Model.** Use all available RI/FS data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to refine, based on newly collected data, the conceptual site model. The model shall define the nature and extent of contamination and the transport and fate of those contaminants. The minimum requirements of the model are given in section 2 of the Handbook. The complexity and detail of the site model shall be consistent with the nature of the site and site problems, and the amount of data available the conceptual site model shall be documented in the Work Plan.

1.3.6 **ARARs Evaluation.** The contractor shall identify all Applicable or Relevant and Appropriate Requirements (ARAR). These ARARs will be documented in the Work Plan.

1.4 Project Deliverables

Deliver the following documents in compliance with the requirements of item VI, the formats required in section 1 and 4 of the Handbook, and the specifications noted below. Draft reports are considered 'drafts' only because they have not been reviewed and approved by the Air Force. In all other respects, 'drafts' shall be complete, in the proper format, fully illustrated, and free of grammatical and typographical errors.

1.4.1 **Scoping Documents.**

a. Engineering Network Analysis (GANTT) (para 1.2.1). Provide within ten (10) days after the issuance of an order. Update and submit quarterly (sequence 3, para 6.1).

b. Work Plan (para 1.2.2). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

c. Sampling and Analysis Plan (1.2.3). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

d. Health and Safety Plan (para 1.2.4). Provide within six (6) weeks after the issuance of an order (sequence 4, para 6.1).

e. Community Relations Plan (para 1.2.5). Provide within eight (8) weeks after issuance of an order (sequence 4, para 6.1).

1.4.2 **Special Notification.** Provide written notification of imminent health hazards and supporting documentation within three (3) days of telephone notification (sequence 15, para 6.1).

1.4.3 **Presentation Materials.** The contractor shall prepare and present up to two (2) presentation packages at meetings coordinated by the Air Force (sequence 9, para 6.1). Attendance of these meetings is included in paragraph 1.1.3 of this SOW. As part of the presentation materials, the contractor shall provide paper copies of all slides and overheads.

1.4.4 **Meeting Summaries** (para 1.1.3). Provide no later than five (5) days after conclusion of each meeting (sequence 18, para 6.1).

1.4.5 **Newsletter.** Prepare and submit a quarterly newsletter which presents the status of the entire base IRP Program. This will include preparing an outline resulting from input by all contractors involved in the program. The outline must be approved by the base and TPM prior to submittal of the newsletter. The final product will be printed and distributed as agreed to by the TPM. Assume a maximum of two (2) newsletters (Sequence no. 3).

1.4.6 **Fact Sheets.** As required by the base IRP Program, prepare and submit fact sheets which facilitate the public's understanding of the IRP Program. These sheets should include key community concerns regarding sites as specified by the base. Use the format agreed to by the base and TPM. Print and distribute the fact sheets as agreed to by the TPM. Assume a maximum of two (2) fact sheets (Sequence no. 3).

1.4.7 **Public Notices.** In accordance with paragraph 1.3.6.2, prepare and submit public notices for the Fairbanks and local newspapers. Use the format agreed to by the base and TPM (Sequence no. 3).

1.4.8 **Photo Notebook.** In accordance with paragraph 1.3.6.3, develop a photo notebbok which focuses on the overall base IRP Program. Prior to implementation, submit a conceptual layout of the notebook for review by the base and TPM (Sequence no. 9).

1.4.9 **Mailing List.** In accordance with the base Community Relations coordinator and paragraph 1.3.6.4, update the existing mailing list on a quarterly basis (Sequence no. 3).

1.4.10 **Maps.** In accordance with the base community Relations coordinator and paragraph 1.3.6.5, prepare presentation quality maps.

II. Site Location and Dates

Dew Line Sites and Cape Lisburne, date to be established.

III. Base Support The base will:

3.1 Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of IRP sites under investigation.

DEWSCOPG.DOC

3.2 Arrange for personnel identification badges, vehicles passes, and/or entry permits with the contention the contractor will provide necessary information to the base personnel no less than four weeks before needed.

3.3 Provide the contractor with all previously approved documents which provide information on all IRP efforts conducted at Dew Line Sites and Cape Lisburne and will aid in the determination of the amount of field work and analyses which need to be conducted.

IV. Government Furnished Property

See above in section III.

V. Government Points of Contact:

5.1 MAJCOM Coordinator

Major James R. Williams III
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.2 Restoration Team Chief

Mr. Marty M. Faile
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.3 Base Point of Contact (POC)

Mr. Jim Wolfe
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

5.4 Public Affairs Coordinator

Ms. Wende Wolf
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

DEWSCOPO.DOC

VI. Deliverables

6.1 Attachment 1 of the Basic Contract

Sequence numbers 1 and 5 listed in attachment 1 to the basic contract app. all orders. Guidance for preparing R&D Status Reports (sequence 1) is contained in the Handbook, section 4. In addition, the sequence numbers an dates listed below are applicable to this order:

Sequence No.	PRS No.	Block 10 (freq.)	Block 11 (as of date)	Block 12 (date of 1st. submit.)	Block 13 (date of final report)	Block (no. of copies)
1 (NETWORK ANALYSIS)	I.1.4.1a	QTRLY	12APR93	30APR93	a	4
4 (WORK PLAN)	I.1.4.1b	ONE/R	12APR93	30MAY93	30JULY93	b
4 (SAP)	I.1.1.4c	ONE/R	12APR93	30MAY93	30JULY93	b
4 (HSP)	I.1.4.1d	OTIME	12APR93	30MAY93	-	18
4 (COMM. REL. PLAN)	I.1.1.4e	ONE/R	12APR93	30MAY93	31DEC93	b
16 (SPECIAL NOTIF.)	I.1.6.2	OTIME	c	c	-	3
9 (PRESENT. MATERIAL)	I.1.4.3	ASREQ	d	d	-	10
18 (MTG. RPTS)	I.1.4.4	ONE/R	e	e	-	5
3 (NEWSLETTER)	I.1.4.5	QTRLY	12APR93	30NOV93	a	f
3 (FACT SHEETS)	I.1.4.6	ASREQ	12APR93	15JUL93	g	-
3 (PUBLIC NOTICES)	I.1.4.7	ASREQ	12APR93	15JUL93	g	[illegible]
9 (PHOTO NOTEBOOK)	I.1.4.8	OTIME	12APR93	15JUL93	-	-
3 (MAILING LIST)	I.1.4.9	QTRLY	12APR93	15JUL93	a	-
3 (MAPS)	I.1.4.10	OTIME	12APR93	15JUL93	-	2

6.2 Reserved.

6.3 Notes

a. Submit Quarterly Thereafter.

b. One (1) first draft plan (8 copies), one (1) second draft plan (8 copies), and one (1) final plan (10 copies) are required. Incorporate Air Force comments into the second draft and final plan as specified by the TPM. Supply AFCEE/ESR with an advance copy of the first draft, second draft, and final plan for acceptance prior to distribution. Distribute the remaining copies of each plan as specified by the TPM. The second and final reports shall be submitted within three (3) weeks of receipt of comments from the TPM.

c. Primary and Secondary Documents. One first draft report (25 copies), one second draft report (25 copies), and one final report (35 bound copies plus the original camera-ready copy and a 3.5 inch disk formatted in WordPerfect 5.1 containing the document file) are required. Incorporate Air Force comments into the second draft and final reports as specified by the TPM. Supply the TPM with an advance copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute the remaining copies as specified by the TPM .

d. Provide written notice with supporting documentation within three (3) days of telephone notification and at the direction of the TPM. Assume a maximum of 100 pages.

e. Provide within one (1) week of task/meeting completion.

f. Provide 500 copies of the Newsletters and distribute as agreed to by the TPM. This includes mailing the final product to on-base personnel and addresses on the existing mailing list.

g. Provide draft and final deliverables. Provide two advance copies to the AFCEE TPM and to the 11 CEOS Community Relations Coordinator for acceptance prior to preparation of the final deliverables.

h. Provide poster-size map.

DBWSCOPO.DOC

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 3

2. [P]OC INSTRUMENT ID NO. (PIIN): [F]33615-90-D-4010
3. SPIIN: 002201
4. EFFECTIVE DATE:
5. REQUISITION/PURCHASE REQUEST PROJECT NO.: FY7624-93-08305
6. BCC/DMS RATING: --

7. ISSUED BY CODE FQ2826
DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB TX 78235-5353
Buyer: EDWIN CUSTODIO/HSC-PKVBA
Phone: (210) 536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A
DCMAO, BALTIMORE
200 TOWNSONTOWN BLVD., WEST
TOWNSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE
ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207
COUNTY; FAIRFAX
PHONE: (703) 934-3000

MAIL DATE
JUN 1? 1993

IF "9" FOR MULTIPLE FACILITIES SEE SECT "K"

MAILING ADDRESS;
ICF TECHNOLOGY, INC
ATTN: CYNTHIA L. FALCE
FOUR GATEWAY CENTER 12TH FLOOR
PITTSBURGH PA 15222

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1 ST	%	DAYS	NET DAYS
2 ND	%	DAYS	OTHER IF '9'
3 RD	%	DAYS	SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT: MVH/M6V/MVY

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(a) By signing and returning ______ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO ______ THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF ______ IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.243-3, Changes - Time and Materials or Labor Hours (Aug 1987)

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJ: INCREASE IN CEILING AMOUNT

PROJECT OFFICER: MICHAEL F. MCGHEE, AFCEE/ESR, 8001 INNER CIRCLE, SUITE 2, BROOKS AFB, TX 78235-5328

FINANCE OFFICE:(SC1010) DFAS-COLUMBUS CENTER
ATTN: INDEPENDANCE
P.O. BOX 182362, COLUMBUS OHIO 43218-2362

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN ______ COPIES TO ISSUING OFFICE

CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY Gary J. Macdecy

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

23. NAME OF CONTRACTING OFFICER *(Type or print)*
GARY J. MACDECY

24. DATE SIGNED 93 Jun 16

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to the "Changes" Clause of Section I of the basic contract. The ceiling amount for the order is increased by $99,986. from $299, 855. to $399,841. The performance period remains the same, 31 DEC 93,as a result of this change.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A - Cover page - The NTE amount in Block 20 (Cover Page) is increased by $99,986. from $299,855. to $399,841.

b. SECTION B - Supplies and Services - Establish Special ACRN XA.

Item No	Supplies/Services		Quantity Purch Unit	Unit Price Total Item Amt
0001	CLIN Change noun: SAMPLING, ANALYSIS, AND DATA acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y	sec class: U		N N
0002	CLIN Change noun: SUPPORT acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y	sec class: U		N N

c. SECTION C - Description/Specs/Work Statement - The SOW for this order remains the same as the Basic order entitled, "Installation Restoration Program/Remedial Investigation/Feasibility Study for Distant Early Warning (DEW) Line Sites and Cape Lisburne AFS, AK" dated 16 MAR 93.

d. SECTION F - Supplies Schedule Data - is modified to include ACRN AB and Special ACRN XA.

Item No	Supplies Schedule Data		Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change acrn: XA ship to: U	sec class: U	1	93DEC31

0002	CLIN Del Sch Change acrn: XA ship to: U	sec class: U	1	93DEC31

e. SECTION G. - Accounting Classification Data - is amended as set forth below:

ACRN	Acct Class Data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification	Obligation Amount
AB	ACCOUNT ESTABLISH UNCLASSIFIED	5733400 F74400 303 7434 434419 000007 53440 000000 674400	$99,986.00
	pr/mipr data: FY7624-93-08305		
XA	SPECIAL ACRN ESTABLISH UNCLASSIFIED		

descriptive data:
Special ACRN XA funds CLINs 0001 and 0002 and includes the following:

ACRN AA: $299,855.
AB: $ 99,986.
TOTAL $399,841.

Finance Officer: Pay Funds in Alphabetical Order.

3. This supplemental agreement constitutes full settlement of any claims of the contractor under the contract, including the clause entitled, "Changes", arising out of or in connection with the changes effected hereby.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 3

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002202	93JUL23	FY7624-93-08353	--

7. ISSUED BY CODE FQ2826
DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB TX 78235-5353
Buyer: REBECCA ROUNSAVILL/PKVBA
Phone: (210) 536-4502

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A
DCMAO, BALTIMORE
ATTN: CHESAPEAKE
200 TOWNSONTOWN BLVD, WEST
TOWNSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE
ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207
COUNTY; FAIRFAX
PHONE: (703) 934-3000

MAIL DATE
JUL 26 1993

IF "9" FOR MULTIPLE FACILITIES SEE SECT "K"

MAILING ADDRESS;
ICF TECHNOLOGY, INC
ATTN: CYNTHIA L. FALCE
FOUR GATEWAY CENTER 12TH FLOOR
PITTSBURGH PA 15222

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1 ST % DAYS NET DAYS
2 ND % DAYS OTHER IF "9"
3 RD % DAYS SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT
MVX/M6V/MVY

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITCITATIONS

☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by on of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO ______ THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF ______ IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.253-3, Changes - Time and Materials or Labor ~~Hours. (AUG 1987)~~

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJ: INCREASE IN CEILING AMOUNT
PROJECT OFFICER: MICHAEL F. MCGHEE, AFCEE/ESR, 8001 INNER CIRCLE, SUITE 2,
BROOKS AFB, TX 78235-5328
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER
ATTN: DFAS-CO/CHESAPEAKE DIVISION
P.O. BOX 182264, COLUMBUS OHIO 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN ______ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)* BY

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)* BY Gary J. Macdecy

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

23. NAME OF CONTRACTING OFFICER *(Type or print)* GARY J. MACDECY

24. DATE SIGNED 93 Jul 23

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

REFERENCE: AF Form 616 H93-SR329, DATED: 9 JUL 93; EXPIRES: 15SEP 93; $2,9M

1. Pursuant to the "Changes" Clause of Section I of the basic contract. The ceiling amount for the order is increased by $2,899,511.00 from $399,841.00 to $3,299,352.00. The performance period is changed to 94 Feb 15, as a result of this change.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A Cover page - The NTE amount in Block 20 (Cover Page) is increased by $2,899,511.00 from $399,841.00 to $3,299,352.00.

b. SECTION B - Supplies and Services - Establish Special ACRN XA.

Item No	Supplies/Services	Quantity Purch Unit	Unit Price Total Item Amount
0001	CLIN Change sec class: U noun: SAMPLING, ANALYSIS AND DATA acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y		N N
0002	CLIN Change sec class: U noun: SUPPORT acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y		N N
0004	CLIN Establish sec class: U noun: CHEMICAL ANALYSES acrn: XA nsn: N site codes pqa: D acp: D fob: D pr/mirp Data: FY7624-93-08353 type contract: Y	1 LO	N N

c. SECTION C - Description/Specs/Work Statement - The SOW for this order entitled, "Installation Restoration Program Remedial Investigation/Feasibility Study, Stage 1, Distant Early Warning (DEW) Line Sites and Cape Lisburne AFS, AK", dated 6 JUL 93 is attached hereto as Attachment #1 to this modification.

d. SECTION F - Supplies Schedule Data is modified to include ACRN AB and Special ACRN XA.

Item No	Supplies Schedule Data		Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change acrn: XA ship to: U	sec class: U	1	95JANØ1
0002	CLIN Del Sch Change acrn: XA ship to: U	sec class: U	1	95JANØ1
0004	CLIN Del Sch Establish acrn: XA ship to: U	sec class: U	1	95JANØ1

e. SECTION G - Accounting Classification Data - is amended as set forth below:

ACRN	Acct Class data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification		Obligation Amount
AB	ACCOUNT CHANGE UNCLASSIFIED pr/mipr data:	5733400 303 7434 434419 000007 53440 000000 674400	F74400	$2,899,511.00+
XA	SPECIAL ACRN CHANGE UNCLASSIFIED			

descriptive data:
Special ACRN XA funds CLINs 0001, 0002 and 0004 and includes the following:

ACRN AA:	$ 299,855.00	
AB:	$ 99,986.00	(MOD 0022-01)
	$2,899,511.00	(MOD 0022-02)
TOTAL	$3,299,352.00	

FINANCE OFFICER: Pay funds in alphabetical order.

3. This supplemental agreement constitutes full settlement of any claims of the contractor under the contract, including the clause entitled, "Changes", arising out of or in connecting with the changes effected hereto.

1993 JUL 6

STATEMENT OF WORK
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

STAGE 1

DISTANT EARLY WARNING (DEW) LINE SITES and CAPE LISBURNE AFS, AK

I. DESCRIPTION OF WORK

1.1 Scope

1.1.1 **Background.** The objective of the Air Force Installation Restoration Program (IRP) is to assess past hazardous waste disposal and spill sites on Air Force installations and develop remedial actions consistent with the National Contingency Plan (NCP) for those sites which pose a threat to human health and welfare or the environment. This objective is achieved through a Remedial Investigation Feasibility Study (RI/FS) process in which conclusions and recommendations drawn from accurate and validated data are used to structure and guide subsequent activities.

The RI/FS process includes scoping to define data requirements and objectives, a remedial investigation to characterize sites for a baseline risk assessment, and a feasibility study to define and evaluate alternative remedial actions so that a recommended action may be selected. Each of these steps of the RI/FS process can be conducted in stages that focus on particular aspects of the process.

The contractor shall accomplish the actions described in this Statement of Work (SOW) to complete the RI/FS process at the following seven Dew Line Sites and Cape Lisburne:

Barter Island AFS (BAR-M); Bullen Point AFS (POW-3); Point Lonely AFS (POW-1); Point Barrow AFS (POW-M); Point Lay AFS (LIZ-2); Wainwright AFS (LIZ-3); and Oliktok Point AFS (POW-2).

1.1.2 **Requirements for Project Activities.** The Installation Restoration Program (IRP) Handbook referenced in this Statement of Work provides requirements for laboratory and field activities and applicable formats for project documents that shall be used by the contractor. Volume 1 of the Handbook dated May 1992 is provided under separate cover. This document is referenced in this Statement of Work as the Handbook.
The contractor is responsible for the thorough knowledge and understanding of the previous findings and recommendations that affect this task prior to the start of field activities. The documents involved include but are not limited to the IRP Phase I Records Search, and the IRP Phase II plans and reports addressing the Dew Line Sites and Cape Lisburne.

1.1.3 **Meetings.** A maximum of two (2) contractor personnel, including the project leader, shall attend ~~four (4)~~ eight (8) meetings at Elmendorf AFB, AK. Each meeting shall be two (2) 8-hour workdays in duration. All meetings shall be coordinated by the Restoration Team Chief (RTC).

1.1.4 **Special Notifications.** The contractor shall immediately report to the RTC, or designate, via telephone, any data or results generated during this investigation which may indicate an imminent health risk. Following this telephone notification, a written notice shall be prepared and

delivered within three (3) days. This notification shall include supporting documentation (sequence 16, para 6.1)

1.2 Project Scoping Documents

The purpose of the project scoping documents is to clearly and comprehensively define project activities prior to the initiation of field work. The contractor shall prepare and submit the following project scoping documents for this task prior to the initiation of any field activities or laboratory analyses.

1.2.1 **Engineering Network Analysis.** Provide within ten (10) days after the issuance of an order a computer generated network analysis which is a detailed task plan for the RI/FS work efforts. The network analysis (GANTT) chart shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The network analysis (GANTT) shall show both serial and parallel subtasks leading to a deliverable product or report, and shall show early and late start and completion dates with float. The network analysis (GANTT) shall be updated and submitted quarterly (sequence 3, para 6.1).

1.2.2 **Work Plan.** This section will discuss the overall approach, (including a brief summary of the Conceptual Site Model and Data Quality Objectives), major tasks, scope, timeline, and major decision points. Due to the extreme remoteness of the Dew Line Sites and Cape Lisburne, the contractor shall include a detailed plan for logistics and strategy to complete the RI/FS field activities. Follow the format specified in section 1 of the Handbook. In preparing the Work Plan, use previous reports and the information gathered during the literature search and presurvey along with experience at similar sites. Reevaluate the recommendations for Dew Line Sites and Cape Lisburne developed during previous IRP stages (sequence 4, para 6.1).

1.2.3 **Sampling and Analysis Plan (SAP).** The SAP consists of a quality assurance plan (QAPP) and a Field Sampling Plan (FSP). Prepare a SAP describing how project activities will be accomplished in the format specified in section 1 of the Handbook. Incorporate review comments and obtain RTC concurrence prior to the start of field activities (sequence 4, para 6.1).

1.2.4 **Health and Safety Plan (HSP).** Provide a written Health and Safety Plan within eight (8) weeks after the issuance of an order. The contractor shall comply with USAF, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Health and Safety Plan shall provide no less protection than the protection contained in the manual entitled "Health and Safety Requirements for Employees Engaged in Field Activities" dated 1981 and the "Occupational Safety and Health Manual for Hazardous Waste Sites Activities" dated 1985 and 29 CFR 1910. Coordinate the Health and Safety Plan directly with applicable regulatory agencies prior to submittal to AFCEE/ESR. The contractor shall certify to AFCEE/ESR that the contractor has reviewed the coordinated Health and Safety Plan with each employee and also subcontractor's employees prior to the time each employee engages in field activities (sequence 4, para 6.1).

1.2.5 **Community Relations Plan.** The contractor shall prepare a Community Relations Plan (CRP) for the DEW Line Sites and Cape Lisburne AFS outlining the specific public communications and involvement techniques to be used in coordination with remedial site activities (sequence 4, para 6.1). Follow the guidance contained in "Community Relations in Superfund, a Handbook", office of Solid Waste and Emergency Response (OSWER) Directive

9230.0-03C (EPA/540/R-92/009, January 1992, PB92-963341), and other applicable directives. Also, use as a guidance previously accomplished CRP from other installations in Alaska. Appropriately adapt such guidance to the local situation at the DEW Line Sites and Cape Lisburne. As described in OSWER Directive 9230.0-03C, the CRP shall include, but not be limited to, a description of the sites and the community, an overview of the community involvement to date, key community concerns regarding the site and AF site activities, and suggested community relations activities. A contact list of elected officials, agency representatives, and interested groups and individuals shall be included in appropriate copies of the plan. In addition, the plan will include suggested locations for meetings and information repositories. Contractor activities to develop the CRP shall include conducting a review of site information provided by the AF.

1.3 **Project Activities**

The contractor shall conduct the following tasks to achieve the purposes stated herein, in compliance with approved scoping documents, the Handbook, and all applicable regulations and requirements.

1.3.1 **Community Relations.** Provide support to the base public affairs office for the tasks described below pertaining to the RI/FS Community Relations Program.

1.3.1.1 Public meetings and workshops. The contractor shall be responsible for coordinating public meetings and workshops for all DEW Line Sites and Cape Lisburne AFS. This includes producing briefing scripts, slides and any associated products such as response cards and sign-in sheets. As requested by the base Community Relations office in coordination with the RTC, research and provide materials for public queries, news media queries, and news releases. Assume a maximum of one (1) workshop/meeting (Seq. nos. 3,9).

1.3.1.2 Public notices. As required by the base Community Relations office and the RTC, the contractor shall prepare and publish public notices for the Fairbanks and local newspapers. The purpose of these notices is to inform the public of a meeting, workshop, or comment period in which they have the opportunity to be involved in the IRP Program at DEW Line Sites and Cape Lisburne AFS. Also, these notices may be utilized to inform the public of other pertinent program information such as quarterly notices of documents placed in the information repositories. The format for the notices shall be coordinated with the Community Relations office and RTC, and then submitted to the RTC for review prior to delivery to the base. Assume a maximum of two (2) notices (Seq. no. 3).

1.3.1.3 Photo Notebook. The contractor shall develop a photo notebook which focuses on the overall IRP program at DEW Line Sites and Cape Lisburne AFS. The layout of the notebook will be coordinated with the public affairs office and RTC. Assume a maximum of one (1) update (Seq. no. 9).

1.3.1.4 Mailing List. In coordination with the base Community Relations office and the RTC, prepare and update the mailing list on a quarterly basis. Assume a maximum of two (2) updates (Seq. no. 3).

1.3.1.5 Maps. Prepare presentation quality maps of the installations and their sites to use in newsletters and to distribute to the public.

1.3.1.6 Information Repository/Administrative Record. Prepare a listing of all documents required for the Information Repository and Administrative Record. Create an Informatin Repository and Administrative Record. The Reporsitory and Record will be maintained by the 11 CEOS/CEVR Community Relations Coordinator. Assume two locations for the Repository and Record, one in Anchorage and another in Elmendorf AFB, AK. Actual locations will be determined by the 11 CEOS/CEVR Community Relations Coordinator.

1.3.2 **Literature Search.** Conduct a literature search and analyze aerial photos of the DEW Line Sties to supplement existing information that has been collected. The purpose of the literature search is to complete the conceptual site model so that a numerical estimate of risk can be developed.

1.3.3 **Presurvey.** Within eight weeks of the issuance of an order, the contractor shall visit the Dew Line Sites and Cape Lisburne to ensure complete understanding of site conditions. Coordinate this visit with the RTC and the 11 CEOS project manager. The contractor shall look for evidence of contamination at each site visited (e.g., leaking drums, vegetative stress, leachate seeps). The contractor shall observe the physical settings of each site visited to formulate specific recommendations concerning boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. The findings of the presurvey shall be used to prepare the Work Plan, SAP, and HSP for the RI and to prepare scoping documents for the treatability study(ies). Assume one presurvey and one reconnaisance trips.

1.3.4 **Quality Assurance/Quality Control (QA/QC).** A QA/QC program shall be conducted and documented for all work pursuant to this delivery order. Contractor and project-specific documents concerning QA/QC procedures and requirements shall be strictly followed. Data generated under the QA/QC program shall be used by the contractor for evaluating the analytical results and field records assembled for each site to identify accurate and validated data that may be used to assess risk, develop conceptual site models and evaluate alternatives.

1.3.5 **Conceptual Site Model.** Use all available RI/FS data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to refine, based on newly collected data, the conceptual site model. The model shall define the nature and extent of contamination and the transport and fate of those contaminants. The minimum requirements of the model are given in section 2 of the Handbook. The complexity and detail of the site model shall be consistent with the nature of the site and site problems, and the amount of data available the conceptual site model shall be documented in the Work Plan.

1.3.6 **ARARs Evaluation.** The contractor shall identify all Applicable or Relevant and Appropriate Requirements (ARAR). These ARARs will be documented in the Work Plan.

1.3.7 **Data Collection, Sampling, and Analysis Procedures.** The contractor shall conduct field activities, sampling, laboratory analysis, and data quality assessment. Section 2 of the Handbook is recommended for the contractor to follow. The contractor shall conduct all activities in accordance with the WP and the SAP approved by the COR. The COR shall be notified in writing of any planned deviation from the activities specified in these documents. COR approval of deviations is required prior to performance.

The field investigation (including all drilling and sampling operations) shall be supervised by a registered geologist, hydrogeologist, or professional engineer. If required by the state, the on-site field supervisor shall be

certified by the state to install test wells. A detailed log of field conditions, materials penetrated during drilling, well completion, and sampling conditions, as described in Section 2 of the Handbook, shall be maintained and made available for Government inspection upon request. Decisions on well and boring locations, well depths, screened intervals, and all details of the field investigation shall be made by the COR, and the contractor's field or project supervisor.

1.3.8 **Regulatory Requirements and Permits.** All well drilling, development , sampling, laboratory analysis, and other activities pursuant to this effort shall be conducted in strict accordance with all applicable federal and state laws, ordinances, rules and regulations, and all authorities with jurisdiction over such activities. The contractor shall complete permits, applications, other documents, and proficiency tests required by the regulatory agencies. The contractor shall file documents with appropriate agencies and pay all applicable permit and filing fees. The contractor shall identify locations requiring permits to Radar Station Manager. The contractor shall include all correspondence in appendices to the technical reports in accordance with Section 4 of the Handbook.

All laboratory analyses shall conform to all applicable federal, state, and local regulatory agency requirements. If the requirements specify that certification is necessary to conduct one or more specific analyses, the contractor shall furnish documentation showing laboratory certification with the first set of analytical data supplied to AFCEE/ESR and the COR.

The contractor shall containerize and sample materials suspected to be hazardous in accordance with applicable requirements, Guidance from the Handbook, and the approved Plans. The contractor shall transport these containerized materials to a location within the installation boundary designated by the Radar Station Manager at a frequency specified by the Station Manager. The contractor shall handle, store, and/or dispose of potentially hazardous materials. The contractor shall transport and empty containerized materials determined not to be hazardous to locations within the installation boundary identified by the Station Manager.

1.3.9 **Remedial Investigation (RI).** The contractor shall conduct a RI to characterize environmental conditions; define the concentration, nature, and extent of contamination; and quantitatively estimate the risk to human health and the environment and study the area through the collection of geologic and hydrologic data, environmental samples, the laboratory analyses of those samples for potential contaminants, the evaluation of the analytical results and field measurements with respect to quality control data, and the interpretation and analysis of accurate and precise data. The purpose of data collection, sample collection, and laboratory analysis is to determine whether any contaminants generated from installation activities have entered the environment. The field investigation is used to determine the source of any identified contaminants, the magnitude of contamination relative to Applicable or Relevant and Appropriate Requirements (ARARs), and any naturally occurring or background concentrations for specific compounds. The RI shall comply with the specifications, procedures, and methodologies presented in the project-specific SAP. The COR must be notified in writing prior to any modification of or deviation from any activity described in these documents.

1.3.9.1 **Soil Borehole Drilling and Sampling and Well Installation and Sampling.** The contractor shall drill and collect samples from boreholes as specified in the SAP. The contractor shall evaluate the need to install, sample, and develop monitoring or extraction wells.

1.3.9.1.1 **Lithologic Samples.** The contractor shall describe core samples at least every five (5) feet of drilling or at each change in lithology, whichever is less, to indicate significant changes in lithology of characteristic properties that relate to the strata penetrated. Any deviations shall be coordinated with the COR. Guidance for standard identification practices are found in the Handbook. The contractor shall include in the field logbook observations made by the driller and rig geologist during drilling such as depth to water, penetration rate, drill rig behavior, and other observations that might be indicative of changes in formation characteristics. The contractor shall record depth to permafrost in all the soil borings and shall not proceed beyond five (5) feet into the permafrost layer.

1.3.9.1.2 **Drill Cuttings and Drilling Fluids.** The contractor shall containerize all drill cuttings and drilling fluids. All drill cuttings and drilling fluids shall be managed and disposed of in accordance with the project SAP. (Note: The contractor shall be responsible for providing all necessary containers.) The contractor shall be responsible for the logistics of the ultimate disposal of all drill fluids or drill cuttings deemed hazardous in accordance with current EPA off-site disposal policy and state and/or local hazardous waste disposal laws. The contrator shall coordinate with the Station Manager for on-site placement and disposal of all drill cuttings, fluids, purge fluid, and excavated material. If on-site disposal is excluded, all hazardous waste shall be transported by a permitted hazardous waste transporter to a licensed Resource Conservation and Recovery Act (RCRA) approved facility and be accompanied by a Uniform Hazardous Waste Manifest. The contractor shall provide a final, completed copy of the hazardous waste manifest to the 11 CEOS/CEVR. The Radar Stations' hazardous waste managers will sign all hazardous waste manifest documents.

1.3.9.1.3 **Well/Boring Precautions.** The contractor shall mark the field locations of all borings during the planning/mobilization phase of the field investigation. The contractor shall consult with base personnel to minimize the disruption of base activities, to properly position wells with respect to site locations, and to avoid penetrating underground utilities. The contractor shall obtain all permits prior to commencement of digging and drilling operations. The contractor shall utilize a registered land surveyor in determining the elevations and locations of all off-base background study borings. All borings and wells from which samples are taken shall be surveyed by the contractor for vertical and horizontal control. The contractor shall record the positions on project and site specific maps. Bench marks used must have been previously established from and be traceable to a U. S. Coast and Geodetic Survey (USCGS) or U. S. Geological Survey (USGS) survey marker. Clearly identify all bench mark locations on the base map.

1.3.9.1.4 **Water-Level Measurements in Boreholes.** The contractor shall measure water levels in all boreholes after the water level has stabilized. Include this information and the date of measurement in the boring logs. Also, record soil moisture conditions (moist, wet, saturated, etc.) in the boring log.

1.3.9.1.5 **Air Monitoring During Drilling.** The contractor shall monitor the ambient air in the breathing zone above the borehole during all drilling with an appropriate organic vapor analyzer to identify potentially hazardous and/or toxic vapors. Include air monitoring results in borehole logs.

1.3.9.1.6 **Subsurface Soil Sampling.** The contractor shall collect soil samples from borings as specified in the SAP. The SAP specifies the analytical methods, the parameters for analysis, and the estimated number of analyses for soil samples.

1.3.9.1.7 **Well Construction Requirements.** The contractor shall coordinate with the COR to determine well completion requirements (flush or projected above ground surface). All wells shall be secured as soon as possible after drilling. The contractor shall provide corrosion resistant locks for both flush and above-ground well assemblies. The locks shall be compatible with existing wells. The contractor shall turn the lock keys over to 11 CEOS/CEVR POC following completion of the field effort. The contractor shall coordinate with the 11 CEOS/CEVR POC, the RTC, and the COR the selection of exact well and screen placement, gravel pack design, and screen slot size.

1.3.9.1.8 **Well Logs.** For each well, the contractor shall prepare a well completion log and schematic diagram showing well construction details. Lithologic descriptions, well elevation survey data, and other information included in the well logs shall conform to the specifications of the SAP.

1.3.9.1.9 **Well Development.** The contrator shall develop each well as soon as possible. Guidance for well development procedures are found in the the Handbook. The contractor shall measure the rate of water production, pH, specific conductance, and water temperature during well development.

1.3.9.1.10 **Well Placement.** The contractor shall avoid installing wells in depressions or areas subject to frequent flooding and/or standing water. If wells must be installed in such areas, the contractor shall design the wells so standing water does not leak into the top of the casing or cascade down the annular space.

1.3.9.1.11 **Well and Borehole Clean-up.** The contractor shall clean the area following the completion of each well and borehole. The contractor shall return all sites to the original condition of the site.

1.3.9.1.12 **Groundwater and Surface Water Sampling.** The contractor shall collect groundwater and Surface Water samples from newly developed well and existing wells and from surface water bodies. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for groundwater and surface water samples.

1.3.9.1.13 **Composite Sampling.** The contractor shall collect and analyze drill cuttings, fluids, purge fluids, and excavated material. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for composite samples.

1.3.9.2 **Geophysical Surveys.** The contractor shall evaluate whether geophysical surveys are needed (e.g., to determine boundaries of landfills, to locate underground debris, utilities and storage tanks). Where geophysical surveys are appropriate, the contractor shall select a geophysical survey technique or techniques [such as ground penetrating radar (GPR), magnetometer or electromagnetic surveys (EM)] that will best meet the desired application. The technique(s) used shall be approved by the RTC prior to use. Approximate number of surveying days is included in Annex A which is to be used for costing purposes only. Appropriate grid systems shall be established and the contractor shall use the results of this survey to prepare a contour map of the results. Provide this map as an attachment to the first R&D Status Report

submitted after the completion of the geophysical surveys. The contractor shall perform the geophysical surveys before drilling and use the results in selecting the location of soil borings, wells, test pits, if necessary.

1.3.9.3 **Permeability Testing.** The contractor shall determine the need for a permeability test at Cape Lisburne AFS, to provide additional data on the hydrogeologic characteristics of the water table aquifer. The SAP shall specify the method to be used for the permeability test.

1.3.9.4 **Water Level Measurement.** The contractor shall evaluate the need for conducting a complete round of water level measurements in all existing and new wells at Cape Lisburne AFS at the beginning of field work and during the field sampling effort. Data gathered shall be used for interpreting groundwater flow directions and groundwater gradient.

1.3.9.5 **Soil Gas Surveys.** The contractor shall evaluate the need for soil gas surveys and Hydropunch (e.g., to select soil boring locations). If soil gas surveys and hydropunch are included as part of the approved Work Plan and FSP, the contractor shall establish appropriate grid systems. The contractor shall prepare a posting map of soil gas values relative to their location on the grid used. Provide this map as an attachment to the first R&D Status Report submitted after completion of the soil gas survey (sequence 3, para 6.1). Approximate number of surveying days are included in Annex A which is to be used for costing purposes only.

1.3.9.6 **Groundwater Field Screening.** The contractor shall perform groundwater field screening. The SAP shall specify the method, location, and type of groundwater field screening.

1.3.9.7 **Baseline Risk Assessment.** The contractor shall use data supported by acceptable QA/QC results (as measured against QAPP requirements) and the conceptual site model to numerically estimate the risk posed by site contaminants to human health and the environment. The contractor shall identify and list all ARARs for those contaminants detected in environmental samples at the site. The contractor shall provide all ARARs evaluations as an attachment to the Technical Report. Provide the results of the baseline risk assessment in the Technical Report using the formats in Section 4 of the Handbook as a guidance.

The contractor shall identify those sites posing minimal or no threat to human health, welfare, or the environment and for which no further action is appropriate.

The contractor shall use the results of the risk assessment in establishing remedial action objectives and developing remedial alternatives in the Feasibility Study.

1.3.9.8 **Defense Priority Model Scores.** The contractor shall use the Defense Priority Model to score the sites. The score shall be included as an appendix to the RI/FS Technical Report.

1.3.9.9 **Fate and Transport.** The contractor shall perform fate and transport modeling for contaminants of interest to include the projection of future contaminant concentrations within the boundaries of the site. This will be done in conjunction with the RI/FS report.

1.3.13 **Weekly Field Activity Report**

The contractor shall transmit a Weekly field activity report. The AFCEE RTC shall develop the format for the report.

1.4 Project Deliverables

Deliver the following documents in compliance with the requirements of item VI, the formats required in section 1 and 4 of the Handbook, and the specifications noted below. Draft reports are considered "drafts" only because they have not been reviewed and approved by the Air Force. In all other respects, "drafts" shall be complete, in the proper format, fully illustrated, and free of grammatical and typographical errors.

1.4.1 Scoping Documents.

a. Engineering Network Analysis (GANTT) (para 1.2.1). Provide within ten (10) days after the issuance of an order. Update and submit quarterly (sequence 3, para 6.1).

b. Work Plan (para 1.2.2). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

c. Sampling and Analysis Plan (1.2.3). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

d. Health and Safety Plan (para 1.2.4). Provide within six (6) weeks after the issuance of an order (sequence 4, para 6.1).

e. Community Relations Plan (para 1.2.5). Provide within eight (8) weeks after issuance of an order (sequence 4, para 6.1).

1.4.2 **Special Notification.** Provide written notification of imminent health hazards and supporting documentation within three (3) days of telephone notification (sequence 16, para 6.1).

1.4.3 **Presentation Materials.** The contractor shall prepare and present up to two (2) presentation packages at meetings coordinated by the Air Force (sequence 9, para 6.1). Attendance of these meetings is included in paragraph 1.1.3 of this SOW. As part of the presentation materials, the contractor shall provide paper copies of all slides and overheads.

1.4.4 **Meeting Summaries** (para 1.1.3). Provide no later than five (5) days after conclusion of each meeting (sequence 18, para 6.1).

1.4.5 **Newsletter.** Prepare and submit a quarterly newsletter which presents the status of the entire base IRP Program. This will include preparing an outline resulting from input by all contractors involved in the program. The outline must be approved by the base and RTC prior to submittal of the newsletter. The final product will be printed and distributed as agreed to by the RTC. Assume a maximum of two (2) newsletters (Sequence no. 3).

1.3.10 **Feasibility Study (FS).** The contractor shall perform a FS concurrently with the RI. As much of the FS as possible shall be performed early in the RI/FS process and refined as additional RI data are obtained. The contractor shall use the information from the RI and the baseline risk assessment to develop and evaluate remedial action alternatives for each site where a threat to human health or the environment exists. The contractor shall follow the procedures specified in USEPA OSWER Directive 9355.3-01, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA." The contractor shall employ streamlining methods wherever possible and develop and evaluate the minimum number of alternatives needed to provide a range of promising treatment and containment actions. The contractor shall eliminate impracticable alternatives from further consideration early in the FS process. The scope and level of detail shall be consistent with the nature and complexity of site problems.

1.3.10.1 **Develop and Screen Alternatives.** The contractor shall establish remedial action objectives and remediation goals for protecting human health and the environment. These objectives and goals shall be determined based on identified ARARs and acceptable exposure levels as defined in the baseline risk assessment and refined throughout the RI/FS process. Identify general response actions and applicable technologies based on site and contaminant conditions, and combine technologies to formulate distinct alternatives. The contractor shall develop alternatives which eliminate, control, and /or reduce risk to human health or the environment to acceptable levels for each pathway. Where a wide variety of promising alternatives exists, the contractor shall screen the alternatives based on effectiveness, implementability, and cost. The contractor shall detail the development and screening of the alternatives process and identify the alternatives selected for detailed analysis in the Informal Technical Information Report (ITIR).

1.3.10.2 **Detailed Screening of Alternatives.** The contractor shall conduct a detailed analysis on each alternative selected and identified in the above step and approved by the COR. Using the methodology in OSWER Directive 9355.3-01, the contractor shall evaluate each alternative against the nine criteria. In addition to the individual assessment, the contractor shall perform a comparative analysis to determine the relative performance of alternatives. The contractor shall focus the analysis on sub-factors and criteria most pertinent to each site and the scope and complexity of the proposed action. Provide a summary of the Detailed Analysis of Alternatives in the R&D report submitted following task completion. Include summary tables of the individual and comparative analyses that will be used in the Technical Report.

1.3.11 **Desicion Documents.** The contractor shall prepare and submit Decision Documents (DD) following the Handbook Section 4.4 as guidance. The purpose of the DD is to support a remedial action alternative or a no further action alternative.

1.3.12 **Site Specific Requirements.** The contractor shall perform the requirements listed in this SOW in conformance with the guidance of the Handbook, requirements of the approved WP, and the SAP. Annex A specifies the proposed values for field and laboratory activities to be conducted, specifications for field activities, information for sediment and soil samples, analytical methods, parameters for analysis, estimated number of analyses for water/sediment/soil samples, required analytical methods, estimated number of analyses for all core samples, estimated number soil gas analyses for each parameter, and field QC sample requirements for soil and water samples for costing purposes only.

1.4.6 **Fact Sheets.** As required by the base IRP Program, prepare and submit fact sheets which facilitate the public's understanding of the IRP Program. These sheets should include key community concerns regarding sites as specified by the base. Use the format agreed to by the base and RTC. Print and distribute the fact sheets as agreed to by the RTC. Assume a maximum of two (2) fact sheets (Sequence no. 3).

1.4.7 **Public Notices.** In accordance with paragraph 1.3.6.2, prepare and submit public notices for the Fairbanks and local newspapers. Use the format agreed to by the base and RTC (Sequence no. 3).

1.4.8 **Photo Notebook.** In accordance with paragraph 1.3.6.3, develop a photo notebbok which focuses on the overall base IRP Program. Prior to implementation, submit a conceptual layout of the notebook for review by the base and RTC (Sequence no. 9).

1.4.9 **Mailing List.** In accordance with the base Community Relations coordinator and paragraph 1.3.6.4, update the existing mailing list on a quarterly basis (Sequence no. 3).

1.4.10 **Maps.** In accordance with the base community Relations coordinator and paragraph 1.3.6.5, prepare presentation quality maps.

1.4.11 **Information Repository/Administrative Records.** Submit the Information Repository and Administrative Records in accordance with Air Force Guidance and in concurrance with the COR and the base Community Relations Coordinator. (sequence no. 4, para 6.1)

1.4.12 **Data Management.** The contractor shall meet the data deliverable requirements of the Installation Restoration Program Information Management System (IRPIMS). The contractor shall be responsible for recording field and laboratory data into a computerized format as required by the most current version of the IRPIMS Data Loading Handbook (mailed under separate cover). In order to perform this task, the contractor shall use the IRPIMS Quality Control Tool (QC Tool) and PC software utility (mailed under separate cover with software manual) to quality check ASCII data files and to check all data files for compliance with requirements in the IRPIMS Data Loading Handbook. Upon request, the IRPIMS Contractor Data Loading Tool (CDLT) is available. This PC software is designed to assist the contractor in preparing the various ASCII data files.

Individual IRPIMS data files (e.g., analytical results, groundwater level data, etc.), including resubmissions, shall be delivered with a transmittal letter by the contractor to the Air Force Center for Environmental Excellence (AFCEE) in sequence according to a controlled time schedule as identified in the current version of the IRPIMS Data Loading Handbook. The contractor shall include a copy of the Quality Control Tool error report, i.e., output from the QC tool, for each IRPIMS file submission. The error report shall be submitted both in hard copy and as an electronic file on the submission disks with the filename of the error report identified in the transmittal letter (SEQUENCE No. 3).

All contractor data deliverables shall be sent to:

AFCEE/ESD BLDG 624W
ENVIRONMENTAL RESTORATION DIVISION
ATTN: IRPIMS Data Management
Brooks AFB, TX 78235-5000

In addition, the contractor shall provide a copy of the transmittal letter to the Air Force contracting office responsible for the contract, HSC/PKV (Brooks AFB, TX, 78235-5000) for AFCEE contracts. This letter shall identify the files included or otherwise omitted (with an appropriate explanation), the Government contract and delivery order number, and the Air Force POC that is responsible for monitoring the Government contract.

The contractor shall be responsible for the accuracy and completeness of all data submitted. All data entered into the IRPIMS data files and submitted by the contractor shall correspond exactly with the data contained in the original laboratory reports and other documents associated with sampling and laboratory contractual tasks.

Each file delivered by the contractor will be electronically evaluated by AFCEE/ESD for format compliance and data integrity in order to verify acceptance. All files delivered by the contractor are required to be error-free and in compliance with the IRPIMS Data Loading Handbook. Any errors identified by AFCEE/ESD in the submission shall be corrected by the contractor.

1.4.13 **Decision Document.** The contractor shall prepare and submit DD as described in Section 1.3.11 (SEQUENCE No. 4, para 6.1).

1.4.14 **Technical Reports.** Summarize the findings of the tasks pursuant to the SOW, integrate them with the results of all pertinent previous studies, and formulate conclusions and recommendations for future efforts in Technical Reports.

1.4.14.1. **Remedial Investigation (RI) Report** (para 1.3.3). Provide a RI Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.2. **Risk Assessment (RA) Report** (para 1.3.3.7). Provide a RA Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.3 **Feasibility Study Report** (para 1.3.4). Provide a Feadsibility Study Report foillowing the format in section 4.0 of the Handbook. (sequence 4, para 6.1).

1.4.14.4 **RI/FS Technical Report** (para 1.3.3). Provide a RI/FS Technical Report following the format in section 4.0 of the Handbook. The RI/FS Technical Report shall integrate the RI, RA, and FS reports. Provide two microfiche copies with the final RI/FS Technical Report (sequence 4, para 6.1).

1.4.15 **Basewide Comprehensive IRP Document.** The contractor shall develop a comprehensive document that summarizes both the historic and projected IRP activities. This document shall be used as managment tool to efficiently guide future IRP activities at the DEW Line Sites and Cape Lisburne AFS. The contractor shall follow the outline developed by the AFCEE RTC. Assume two (2) updates (sequence no. 4)

1.4.16 **Analytical Data ITIR.** Prepare and submit the following ITIR's:

a. <u>Development & Screening of Alternatives</u> (para. 1.3.10.1). Submit the results of the development and screening of alternatives in an ITIR prepared in compliance with section 3 of the Handbook (sequence 3, para 6.1)

b. Detailed Screening of Alternatives (para 1.3.10.2).

c. DPM Scoring (para 1.3.9.8). Provide scores, a summary of procedures and assumptions, and Automated DPM output tables for all sites scored with DPM (sequence 3, para 6.1).

d. Mylar[R] Map. Construct Radar Stations' maps of Mylar using guidelines in section 3 of the Handbook. The Maps shall contain all sites and related water and sediment sampling locations (sequence no.3, para. 6.1). The contractor shall create and update digitized map files. Use the digitized data file to produce the Mylar map. The contractor shall print the revision date on the Mylar maps and the date shall be encoded in the digitized data file. Provide a copy of the revised digitized data file to AFCEE-ESO/ER (sequence 1, para. 6.2).

e. Geophysical Survey Contour Map (para 1.3.9.2). Provide a contour map showing geophysical survey results. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

f. Soil Gas Map (para 1.3.9.5). Provide site maps showing soil gas data superimposed on the sampling locations and incorporate soil gas data generated by the 11 CEOS/CEOR. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

g. Site Characterization Summary Informal Technical Information Report (SCS ITIR). The contractor shall prepare the report to include the following components:

1. Source identification and contaminant delineation.

2. Identification and ranking of appropriate treatability studies for the listed sites.

3. Data and interpretations integrating the findings of the current study and all previous RI efforts at the sites.

4. Current isoconcentration plots of contaminants detected at each site, lithologic logs of each boring showing contaminants detected and relationship to other borings in the site, and cross-sections of the site showing contaminant distribution.

5. The contents and objectives of a Site Characterization Summary Informal Technical Information Report (ITIR) are specified in the Handbook. The Site Characterization Summary ITIR shall serve as a core document for the RI report. The contractor shall submit an annotated outline of each section of the ITIR for approval by the TPM prior to preparation of the report itself. The contractor shall prepare the report as specified in the accepted annotated outline. The contractor shall submit newly revised portions of the working draft ITIR in order to make available current site characterization data. A prime objective shall be to minimize the volume of comments on the working draft and final submittals by incorporating comments into the report in an on-going manner. The final summary shall contain all sites included in this effort (Sequence No. 4).

h. Weekly Field Activities Report (para 1.3.13). Transmit a Weekly field activities report during field activities pursuant to a format developed by the AFCEE RTC. (Seqence 4, para 6.1)

II. Site Location and Dates

Dew Line Sites and Cape Lisburne, date to be established.

III. Base Support The base will:

3.1 Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of IRP sites under investigation.

3.2 Arrange for personnel identification badges, vehicles passes, and/or entry permits with the contention the contractor will provide necessary information to the base personnel no less than four weeks before needed.

3.3 Provide the contractor with all previously approved documents which provide information on all IRP efforts conducted at Dew Line Sites and Cape Lisburne and will aid in the determination of the amount of field work and analyses which need to be conducted.

IV. Government Furnished Property

See above in section III.

V. **Government Points of Contact:**

5.1 **MAJCOM Coordinator**

Major James R. Williams III
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.2 **Restoration Team Chief**

Mr. Michael F. McGhee
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5293
DSN 240-5293
(210) 536-9026 FAX
DSN 240-9026

5.3 **Base Point of Contact (POC)**

Mr. Jim Wolfe
11 CEOS/CEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

5.4 **Public Affairs Coordinator**

Ms. Wende Wolf
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

VI. Deliverables

6.1 Attachment 1 of the Basic Contract

Sequence numbers 1 and 5 listed in attachment 1 to the basic contract apply to all orders. Guidance for preparing R&D Status Reports (sequence 1) is contained in the Handbook, section 4. In addition, the sequence numbers and dates listed below are applicable to this order:

Sequence No.	Para No.	Block 10 (freq.)	Block 11 (as of date)	Block 12 (date of 1st. submit.)	Block 13 (date of final report)	Block 14 (no. of copies)
3 (NETWORK ANALYSIS)	I.1.4.1a	QTRLY	12APR93	30APR93	a	4
4 (WORK PLAN)	I.1.4.1b	ONE/R	12APR93	30MAY93	30JULY93	b
4 (SAP)	I.1.1.4c	ONE/R	12APR93	30MAY93	30JULY93	b
4 (HSP)	I.1.4.1d	OTIME	12APR93	30MAY93	-	10
4 (COMM. REL. PLAN)	I.1.1.4e	ONE/R	12APR93	30MAY93	31DEC93	b
16 (SPECIAL NOTIF.)	I.1.4.2	OTIME	c	c	-	3
9 (PRESNT. MATERIAL)	I.1.4.3	ASREQ	d	d	-	10
18 (MTG. RPTS)	I.1.4.4	ONE/R	e	e	-	5
3 (NEWSLETTER)	I.1.4.5	QTRLY	12APR93	30NOV93	a	f
3 (FACT SHEETS)	I.1.4.6	ASREQ	12APR93	15JUL93	g	-
3 (PUBLIC NOTICES)	I.1.4.7	ASREQ	12APR93	15JUL93	g	h
9 (PHOTO NOTEBOOK)	I.1.4.8	OTIME	12APR93	15JUL93	-	1
3 (MAILING LIST)	I.1.4.9	QTRLY	12APR93	15JUL93	a	-
3 (MAPS)	I.1.4.10	OTIME	12APR93	15JUL93	-	2
4 INFO REPOS	I.1.4.11	OTIME	31JUL93	-	31JAN94	2
3 (IRPMS Data ITIR) (Data Management) BCHCON BCHLDI BCHSLI BCHWCI BCHSAMP BCHCALC BCHLTD BCHTEST BCHRES BCHGWD	I.1.4.12	OTIME	31JUL93	31JAN94	31MAR94	2
4 DECISION DOC	I.1.4.13	ONE/R	i	i	31OCT94	b
4 RI REPORT	I.1.4.14.1	ONE/R	15SEP93	15FEB94	30APR94	b
4 RISK ASSESSMENT	I.1.4.14.2	ONE/R	1OCT93	16MAY94	15JUL94	b
4 FEASIB. STUDY	I.1.4.14.3	ONE/R	30SEPT93	30AUG94	-	b
4 RI/FS Report	I.1.4.14.4	ONE/R	30SEP93	30SEP94	1JAN95	b
4 IRP DOCUMENT	I.14.15	ONE/R	31JUL93	31OCT93	10DEC93	b
3 SCREENING ALTER ITIR	I.1.4.16a	OTIME	30SEP93	30DEC93	-	10
3 DETAL ANALYSIS ALTER ITIR	I..1.4.16.b	OTIME	28 FEB94	30MAR94	-	10
1 DPM SCORING	I.1.4.16c	OTIME	30SEP93	j	j	3
3 MYLAR MAP	I.1.4.16d	OTIME	k	k	-	5
3 GEOPHYS CONT	I.1.4.16.e	OTIME	l	l	-	10
3 SOIL GAS MAP	I.1.4.16f	OTIME	l	l	-	10
4 SCS ITIR	I.1.4.16g	ONE/R	15SEP93	30NOV93	15FEB94	5
4 WEEKLY ACT REP	I.1.4.16h	WEEKLY	13AUG93	13AUG93	-	1

6.2 Reserved.

6.3 Notes

a. Submit Quarterly Thereafter.

b. One (1) first draft plan (8 copies), one (1) second draft plan (8 copies), and one (1) final plan (10 copies) are required. Incorporate Air Force comments into the second draft and final plan as specified by the RTC. Supply AFCEE/ESR with an advance copy of the first draft, second draft, and

final plan for acceptance prior to distribution. Distribute the remaining copies of each plan as specified by the RTC. The second and final reports shall be submitted within three (3) weeks of receipt of comments from the RTC.

c. Primary and Secondary Documents. One first draft report (25 copies), one second draft report (25 copies), and one final report (35 bound copies plus the original camera-ready copy and a 3.5 inch disk formatted in WordPerfect 5.1 containing the document file) are required. Incorporate Air Force comments into the second draft and final reports as specified by the RTC. Supply the RTC with an advance copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute the remaining copies as specified by the RTC .

d. Provide written notice with supporting documentation within three (3) days of telephone notification and at the direction of the RTC. Assume a maximum of 100 pages.

e. Provide within one (1) week of task/meeting completion.

f. Provide 500 copies of the Newsletters and distribute as agreed to by the RTC. This includes mailing the final product to on-base personnel and addresses on the existing mailing list.

g. Provide draft and final deliverables. Provide two advance copies to the AFCEE RTC and to the 11 CEOS Community Relations Coordinator for acceptance prior to preparation of the final deliverables.

h. Provide poster-size map.

i. Submit with the second draft Technical Report

j. Submit with the Technical Report

k. Provide with the Technical Report

l. Provide within four (4) weeks of task completion

ANNEX-A, TABLE A-1
SUMMARY OF ESTIMATED FIELD WORK
FOR COST-ESTIMATING PURPOSES ONLY

Estimated Number of Monitor Wells to be Constructed	5
Estimated Footage of Monitor Wells	100
Estimated Number of Water Samples for Lab Analysis	339
Estimated Number of Surface and Subsurface Soil Sampling	1350
Estimated Number of Soil Samples from Augerings	1350
Estimated Number of Containerized Waste Samples	40
Estimated Number of Disposal Water Samples	5
Estimated Number of Sludge Samples	5
Estimated Number of Wipe Samples	3
Estimated Number of Geophysical Surveys	3
Estimated Total Number of Survey Days	20
Estimated Number of Soil Gas Survey Days	20

Annex-A, Table A-2
Analytical METHODS AND ESTIMATED TOTAL NUMBER OF SOIL ANALYSES
(for Cost Estimating Purposes Only)

	analytical method (a)	Reporting Units	Number of Analyses	Trip Blanks	Amb. Cond Blanks	Equipment Blanks	Dup/Rep	Second Column (b)	Total Analyses
Petroleum Hydrocarbon (Gasoline Range Organics)	SW3050/SW8015 (mod)	mg/Kg	400	20	20	20	40	-	500
Petroleum Hydrocarbon (Diesel Range Organics)	SW3050/SW8015 (mod)	mg/Kg	400			20	40	-	460
ICP Screen (23 Metals, exclude Boron and Silica)	SW3050/SW6010	mg/Kg	100	-	-	6	10	-	116
Arsenic	SW3050/SW7060	mg/Kg	-	-	-	-	-	-	0
Lead	SW3050/SW7421	mg/Kg	-	-	-	-	-	-	0
Mercury	SW7471	mg/Kg	-	-		-	-	-	0
Selenium	SW3050/SW7740	mg/Kg	-	-		-	-	-	0
Organochlorine Pesticides and PCBs	SW3540/SW8080	mg/Kg	500	-	-	20	50	250	820
Volatile Organic Compounds	SW8240	mg/Kg	72	8	8	4	7	36	135
Semivolatile Organic Compounds	SW3540/SW8270	mg/Kg	100	-		10	10	-	120
Polynuclear Aromatic Hydrocarbons	SW3540/SW8310	mg/Kg	-	-		-	-	-	0
Volatile Organic Compounds	SW5030/SW8010	mg/kg	-	-		-	-	-	0
Volatile Organic Compounds	SW5030/SW8020	mg/kg	-	-		-	-	-	0
Volatile Organic Compounds	SW5030/SW8260	mg/kg	-	-		-	-	-	0
Total Organic Compounds	SW5030/SW9060	mg/kg	88	-		-	4	8	100
Cyanide, Total	SW9010	mg/Kg	-	-		-		-	0
Toxic Characteristic Leaching Procedures (TCLP)	SW1311	mg/L	40	-	-	-	-	-	40
Soil Moisture Content	ASTM D2216	Percent (%)	650	-		-	-	-	650
Soil PH	SW9045		650	-	-	-	-	-	650
Sulfer Cleanup/Florisil Cleanup	SW3660/SW3620		-	-	-	-	-	-	0
Gel-Permeation Cleanup	SW3640		-	-	-	-	-	-	0
Total Analyses			3000	28	28	80	161	294	3591

Annex A, TABLE A-3
Analytical Methods and Estimated Total Number of Water Analyses
(For Cost Estimating Purposes Only)

	analytical method (a)	Reporting Units	Number of Analyses	Trip Blanks	Amb. Cond Blanks	Equipment Blanks	Dup/Rep	Second Column(b)	Total Analyses
Alkalinity-Carbonate, Bicarbonate, & Hydroxide (field test)	A403	mg/L	10			-	1	-	11
Specific Conductance (field test)	E120.1	mg/L	10			-	1	-	11
pH (field test)	E150.1	µmhos/cm	15		-	-	2	-	17
Residue, Filterable (Total Dissoloved Solids)	E160.1	mg/L	80		-	3	8	-	91
Non-Filterable Residue (Total Suspended Solids)	E160.2	mg/L	80	-	-	-	8		88
Temperature (field test)	E170.1	deg C	200		-	-	-	-	200
Common Anions (Chloride, Fluoride, Sulfate)	E325.1	mg/L	-	-	-	-	-	-	0
Nitrogen, Nitrate+nitrite	E353.2	mg/L	-		-	-	-	-	0
ICP Screen (23 metals, exclude Boron and Silica)	SW3005/SW6010	mg/L	100		-	7	25	-	132
Arsenic	SW7060	mg/L	-		-	-	-	-	0
Lead	SW3005/SW7421	mg/L	100	-	-	2	10	-	112
Mercury	SW7470	mg/L	-		-	-	-	-	0
Selenium	SW7740	mg/L			-	-	-	-	0
Petroleum Hydrocarbons (Gasoline Range Organics)	SW5030/SW8015 (mod.)	mg/L	150	10	10	5	35	-	210
Petroleum Hydrocarbons (Diesel Range Organics)	SW5030/SW8015 (mod.)	mg/L	150	-	-	5	35	-	190
Purgeable Halocarbons	SW5030/SW8010	µg/L	150	8	8	4	25	75	270
Nonhalogenated Volatile Organics	SW5030/SW8015	µg/L	150	8	8	4	25	125	320
Purgeable Aromatics	SW5030/SW8020	µg/L	150	8	8	4	25	125	320
Organochlorine Pesticides and PCBs	SW3510/SW8080	µg/L	166	-	-	3	17	83	269
Semivolatile Organic Compounds	SW3510/SW8270	µg/L	150	-	-	4	15	-	169
Polynuclear Aromatic Hydrocarbons	SW3510/SW8310	µg/L	150	-	-	4	15	-	169
Volatile Organic Compounds	SW3510/SW8260	µg/L	-		-	-	-	-	0
Volatile Organic Compounds	SW3510/SW8240	µg/L	150	8	8	4	25	125	320
Total Organic Compounds	SW9060	µg/L	80			4	10		94
Total Petroleum Hydrocarbon (WTPH-HCID)	E418.1	mg/L	-	-	-	-	-	-	0
Sulfur Cleanup/Florisil Column Cleanup	SW3660/SW3620	-	-	-		-	-	-	0
Gel-Permeation Cleanup	SW3640	-	-	-		-	-	-	0
COLUMN TOTALS	-		2041	42	42	53	282	533	2993

Notes:

a Unless an abbreviated list of analytes is specified under "Parameter" above, the analytical protocol shall include all analytes listed in the referenced analytical method. The methods cited are from the following sources:

"A" Methods	Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985)
"E" Methods	Methods for Chemical Analysis of Water and Wastes, EPA Manual, 600/4-79-020 (USEPA, 1983--with additions)
"SW" Methods	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (USEPA, 1986)
"ASTM" Methods	American Society for Testing and Materials, 1919 Race treet, Philadelphia, PA 19103

b The maximum number of second-column confirmation analyses shall not exceed fifty (50) percent of the actual number of field samples (to include duplicates, replicates, ambient, condition blanks, trip blanks, and equipment blanks). If the number of samples requiring second-column confirmation exceeds this allowance, contact the HSD Technical Project Manager. The total number of samples listed in Tables A-4 and A-5 includes the allowance applicable to each GC method. IF GC/MS, or a combination of second-column GC and GC/MS, is used, the total cost of all such analyses for a particular parameter shall not exceed the funding allowed for positive confirmation using only second-column GC.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 2

2. PROG INSTRUMENT ID NO. (PIIN): F33615-90-D-4010
3. SPIIN: 002203
4. EFFECTIVE DATE: 94 FEB 15
5. REQUISITION/PURCHASE REQUEST PROJECT NO.: FY7624-94-08235
6. SCO/DMS RATING

7. ISSUED BY — CODE FA8900
DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIAL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB, TX 78235-5353
Buyer: EDWIN CUSTODIO/PKVBA
Phone: (210) 536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) — CODE S2404A
DCMAO, BALTIMORE
ATTN: CHESAPEAKE
200 TOWNSONTOWN BLVD, WEST
TOWNSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS — CODE 69148 — FACILITY CODE
IF "9" FOR MULTIPLE FACILITIES SEE SECT "K"
ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207
COUNTY; FAIRFAX
PHONE; (703) 934-3000

ADVANCE COPY

MAILING ADDRESS;
ICF TECHNOLOGY, INC
ATTN; CYNTHIA L. FALCE
FOUR GATEWAY CENTER 12TH FL.
PITTSBURGH PA 15222

10. SECURITY CLAS: U

11. DISCOUNT FOR PROMPT PAYMENT
1ST % DAYS; 2ND % DAYS; 3RD % DAYS; NET DAYS; OTHER IF '9' SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT: MVH/M6V/MVH

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS
☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By signing and returning ____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS
☐ THIS CHANGE IS ISSUED PURSUANT TO ____ THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.
☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.
☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF ____ IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.
☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR52.253-3, CHANGES-TIME&MATLS OR LABOR HRS (AUG87)

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS (Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.) SUBJECT: TIME EXTENSION AT NO INCREASE IN CEILING AMOUNT
PROJECT OFFICER: MICHAEL F. MCGHEE, AFCEE/ESR, BROOKS AFB, TX 78235-5328
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER
ATTN:DFAS-CO/CHESAPEAKE DIV.
P.O.BOX 182264, COLUMBUS OHIO 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN ____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR (Signature of person authorized to sign) BY

22. UNITED STATES OF AMERICA (Signature of Contracting Officer) BY Gary J. Macdecy

20. NAME AND TITLE OF SIGNER (Type or print)
21. DATE SIGNED
23. NAME OF CONTRACTING OFFICER (Type or print): GARY J. MACDECY
24. DATE SIGNED: 94 FEB 17

AFMC FORM 702, JUL 92 — REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to the "Changes" Clause of Section I of the basic contract. The performance period and the final delivery schedule are changed from 15 Feb 94 (performance period) and 1 Jan 95 (final delivery schedule date) to 31 Dec 94. The ceiling amount of this delivery order will not be affected by this modification. This modification was generated by request of the contractor with no increase to the ceiling amount. contractor's letter dated 10 Feb 94 is incorporated to this document by reference.

ADVANCE COPY

REF 68X

CONTRACTOR COPY

68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 4

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002204	.L DATE	FY7624-94-08663	

7. ISSUED BY CODE FA8900

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PKVBC
8005 9TH STREET
BROOKS AFB TX 78235-5318
Buyer: BRENDA DILLARD, HSC/PKVBB
Phone: (210) 536-4503

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO BALTIMORE
ATTN: CHESAPEAKE
200 TOWSONTOWN BLVD, WEST
TOWSON MD 21204-5299

9. CONTRACTOR CODE 69148 FACILITY CODE
NAME AND ADDRESS
ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207

IF "9" FOR MULTIPLE FACILITIES SEE SECT "K"

COUNTY: FAIRFAX
PHONE: (703) 934-3000

MAIL DATE
AUG 15 1994

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT
NONE

1 ST % DAYS — NET DAYS
2 ND % DAYS — OTHER IF '9'
3 RD % DAYS — SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT
MEC/M5E/MVT

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITCITATIONS

☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by on of the following methods:

(a) By signing and returning ______ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO ______
THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF ______
IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.243-3, CHANGES - TIME AND MATERIALS OR LABOR HOUI

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJECT: REVISION TO STATEMENT OF WORK
PROJ MNGR: SAMER N. KARMI, AFCEE/ERDW, 8001 INNER CIRCLE, BROOKS AFB, TX
FINANCE OFFICE: (SC1030)DFAS COLUMBUS CENTER, ATTN: DFAS-CO/CHESAPEAKE DIV
PO BOX 182264, COLUMBUS OH 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN ______ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY William M Watts

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

23. NAME OF CONTRACTING OFFICER *(Type or print)*
WILLIAM M. WATTS

24. DATE SIGNED
15 AUG 94

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to the "Changes" Clause in Section I of the basic contract, the Statement of Work for Delivery Order 0022, dated 06 Jul 93 is superseded by the revised Statement of Work, dated 17 Jul 94. The subject delivery order ceiling amount is increased by $229,526.00.

2. As a result of paragraph 1 above, the said order is more specifically modified as set forth below:

a. SECTION A - Cover Page - The Not-to-Exceed amount in block 20 (cover page) is increased BY $229,526.00 from $3,299,352.00 to $3,528,878.00."

b. SECTION B - THE SCHEDULE

Item No	Supplies/Services		Quantity Purch Unit	Unit Price Total Item Amount
0001	CLIN Change	sec class: U	1 LO	N N

noun: SAMPLING, ANALYSIS AND DATA
acrn: XA nsn: N
site codes: pqa: D acp: D fob: D
pr/mipr data: FY7624-94-08202, FY7624-93-08305, FY7624-94-08353, FY7624-94-08235, and FY7624-94-08663
type contract: Y

descriptive data:
Conduct work in accordance with the Statement of Work (SOW) of this order, dated 17 JUL 94 and Section C, The Description/Specifications of the Basic contract. Submit data in accordance with Attachment #1, the Contract Data Requirements List (CDRL) of the basic contract as implemented by paragraph VI of this order's SOW. This modification adds $83,590.00 to the price for CLIN 0001.

Item No	Supplies/Services		Quantity Purch Unit	Unit Price Total Item Amount
0002	CLIN Change	sec class: U	1 LO	N N

noun: SAMPLING, ANALYSIS AND DATA
acrn: XA nsn: N
site codes: pqa: D acp: D fob: D
pr/mipr data: FY7624-94-08202, FY7624-93-08305, FY7624-94-08353, FY7624-94-08235, and FY7624-94-08663
type contract: Y

descriptive data:
Provide support in accordance with the Statement Work (SOW) of this order, dated 17 JUL 94 and Section C, The Description/Specification of the basic contract. This modification adds $128,148.00 to the price for CLIN 0002.

SECTION B - THE SCHEDULE (Cont'd)

Item No	Supplies/Services		Quantity Purch Unit	Unit Price Total Item Amount
0004	CLIN Change	sec class: U	1 LO	N N

noun: CHEMICAL ANALYSES
acrn: XA nsn: N
site codes: pqa: D acp: D fob: D
pr/mipr data: FY7624-94-08353, FY7624-94-08235, and
FY7624-94-08663
type contract: Y

descriptive data:
This modification adds $17,788.00 to the price
for CLIN 0004.

c. SECTION C - Description/Specs - The SOW for this order entitled "Installation Restoration Program Remedial Investigation/Feasibility Study, Distant Early Warning (DEW) Line Sites and Cape Lisburne AFS, AK", dated 17 Jul 94 is attached hereto as Attachment #1 to this modification.

d. SECTION F - Supplies Schedule Data - The delivery schedule is modified as set forth below:

Item No	Supplies Schedule Data		Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change acrn: XA ship to: U	sec class: U	1	95APR01
0002	CLIN Del Sch Change acrn: XA ship to: U	sec class: U	1	95APR01
0004	CLIN Del Sch Establish acrn: XA ship to: U	sec class: U	1	95APR01

e. SECTION G - Accounting Classification Data:

ACRN	Acct Class data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification		Obligation Amount
AC	ACCOUNT ESTABLISH UNCLASSIFIED	5743400 304 7431 434419 040000 53440 000000 674400	F74400	$229,526.00+
	pr/mipr data: FY7624-94-08663			
XA	SPECIAL ACRN CHANGE UNCLASSIFIED			

descriptive data:
Special ACRN XA funds CLINs 0001, 0002, and 0004 and includes the following:

AA:$ 299,855.00
AB:$ 99,986.00 (mod 0022,01)
:$2,899,511.00 (mod 0022,02)
AC:$ 229,526.00 (mod 0022-04)
TOTAL $3,528,878.00

FINANCE OFFICER: Pay funds in alphabetical order.

3. All other terms and conditions remain unchanged.

1994 JUL 17 ~~1993 JUL 6~~

STATEMENT OF WORK
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

~~STAGE 1~~

DISTANT EARLY WARNING (DEW) LINE SITES and CAPE LISBURNE AFS, AK

I. DESCRIPTION OF WORK

1.1 Scope

1.1.1 **Background.** The objective of the Air Force Installation Restoration Program (IRP) is to assess past hazardous waste disposal and spill sites on Air Force installations and develop remedial actions consistent with the National Contingency Plan (NCP) for those sites which pose a threat to human health and welfare or the environment. This objective is achieved through a Remedial Investigation Feasibility Study (RI/FS) process in which conclusions and recommendations drawn from accurate and validated data are used to structure and guide subsequent activities.

The RI/FS process includes scoping to define data requirements and objectives, a remedial investigation to characterize sites for a baseline risk assessment, and a feasibility study to define and evaluate alternative remedial actions so that a recommended action may be selected. Each of these steps of the RI/FS process can be conducted in stages that focus on particular aspects of the process.

The Contractor shall accomplish the actions described in this Statement of Work (SOW) to complete the RI/FS process at the following seven Dew Line Sites and Cape Lisburne:

Barter Island AFS (BAR-M); Bullen Point AFS (POW-3); Point Lonely AFS (POW-1); Point Barrow AFS (POW-M); Point Lay AFS (LIZ-2); Wainwright AFS (LIZ-3); and Oliktok Point AFS (POW-2).

1.1.2 **Requirements for Project Activities.** ~~The Installation Restoration Program (IRP) Handbook referenced in this Statement of Work provides requirements for laboratory and field activities and applicable formats for project documents that shall be used by the Contractor. Volume 1 of the Handbook dated May 1992 is provided under separate cover. This document is referenced in this Statement of Work as the Handbook.~~ The Handbook to Support the Installation Restoration Program (IRP) Statements of Work, dated September 1993, referred to in this SOW as "The Handbook," is provided under separate cover as general guidance only. Any reference within the Handbook language regarding compliance and/or formats for reports as a requirement of this Delivery Order shall be considered deleted. If a conflict is identified between this general guidance and any OSWER, U.S. Environmental Protection Agency (EPA), or other regulatory guidance or requirements, the Handbook shall be disregarded. Also, references to requirements for approval for deviations throughout the Handbook shall be considered invalid. Finally, the Method Detection Limits (MDLs) identified in the Handbook are a consolidation of numerous CFR documents which incorporate current EPA requirements. However, the Contractor shall be responsible for any updates in the CFR. The Contractor is responsible for the thorough knowledge and understanding of the previous findings and recommendations that affect this

task prior to the start of field activities. The documents involved include but are not limited to the IRP Phase I Records Search, and the IRP Phase II plans and reports addressing the Dew Line Sites and Cape Lisburne.

1.1.3 **Meetings.** ~~A maximum of two (2) Contractor personnel, including the project leader, shall attend eight (8) meetings at Elmendorf AFB, AK. Each meeting shall be two (2) 8-hour workdays in duration.~~ All meetings shall be coordinated by the Restoration Team Chief (RTC).

1.1.4 **Special Notifications.** The Contractor shall immediately report to the RTC via telephone, any data or results generated during this investigation which may indicate an imminent health risk. Following this telephone notification, a written notice shall be prepared and delivered within three (3) days. This notification shall include supporting documentation (sequence 16, para 6.1)

1.2 Project Scoping Documents

The purpose of the project scoping documents is to clearly and comprehensively define project activities prior to the initiation of field work. The Contractor shall prepare and submit the following project scoping documents for this task prior to the initiation of any field activities, removal actions, or laboratory analyses.

1.2.1 **Engineering Network Analysis.** Provide within ten (10) days after the issuance of an order a computer generated network analysis which is a detailed task plan for the RI/FS work efforts. The network analysis (GANTT) chart shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The network analysis (GANTT) shall show both serial and parallel subtasks leading to a deliverable product or report, and shall show early and late start and completion dates with float. The network analysis (GANTT) shall be updated and submitted quarterly (sequence 3, para 6.1).

1.2.2 **Work Plan.** This section will discuss the overall approach, (including a brief summary of the Conceptual Site Model and Data Quality Objectives), major tasks, scope, timeline, and major decision points. Due to the extreme remoteness of the Dew Line Sites and Cape Lisburne, the Contractor shall include a detailed plan for logistics and strategy to complete the RI/FS field activities. Follow the format specified in section 1 of the Handbook. In preparing the Work Plan, use previous reports and the information gathered during the literature search and presurvey along with experience at similar sites. Reevaluate the recommendations for Dew Line Sites and Cape Lisburne developed during previous IRP stages. The Contractor shall also prepare a draft and final addendum to the existing DEW Lines RI/FS work plan. The addendum shall detail the removal activities occurring at Cape Lisburne LRRS pursuant to paragraph I.1.3.14 of this SOW. (sequence 4, para 6.1).

1.2.3 **Sampling and Analysis Plan (SAP).** The SAP consists of a quality assurance plan (QAPP) and a Field Sampling Plan (FSP). Prepare a SAP describing how project activities will be accomplished in the format specified in section 1 of the Handbook. The Contractor shall also prepare a short addendum to this basic SAP which focuses on those sampling and analysis activities undertaken as part of the removal action specified in paragraph I.1.3.14 of this SOW. Incorporate review comments and obtain RTC concurrence prior to the start of field activities (sequence 4, para 6.1).

1.2.4 **Health and Safety Plan (HSP).** Provide a written Health and Safety Plan within eight (8) weeks after the issuance of an order. The Contractor shall also prepare an addendum to the existing DEW Lines RI/FS HSP, concerning removal activities conducted pursuant to paragraph I.1.3.14 of this SOW. The Contractor shall comply with USAF, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Health and Safety Plan shall provide no less protection than the protection contained in the manual entitled "Health and Safety Requirements for Employees Engaged in Field Activities" dated 1981 and the "Occupational Safety and Health Manual for Hazardous Waste Sites Activities" dated 1985 and 29 CFR 1910. Coordinate the Health and Safety Plan directly with applicable regulatory agencies prior to submittal to AFCEE/ESR. The Contractor shall certify to AFCEE/ESR that the Contractor has reviewed the coordinated Health and Safety Plan with each employee and also subcontractor's employees prior to the time each employee engages in field activities (sequence 4, para 6.1).

1.2.5 **Community Relations Plan.** The Contractor shall prepare a Community Relations Plan (CRP) for the DEW Line Sites and Cape Lisburne AFS outlining the specific public communications and involvement techniques to be used in coordination with remedial site activities (sequence 4, para 6.1). Follow the guidance contained in "Community Relations in Superfund, a Handbook", office of Solid Waste and Emergency Response (OSWER) Directive 9230.0-03C (EPA/540/R-92/009, January 1992, PB92-963341), and other applicable directives. Also, use as a guidance previously accomplished CRP from other installations in Alaska. Appropriately adapt such guidance to the local situation at the DEW Line Sites and Cape Lisburne. As described in OSWER Directive 9230.0-03C, the CRP shall include, but not be limited to, a description of the sites and the community, an overview of the community involvement to date, key community concerns regarding the site and AF site activities, and suggested community relations activities. A contact list of elected officials, agency representatives, and interested groups and individuals shall be included in appropriate copies of the plan. In addition, the plan will include suggested locations for meetings and information repositories. Contractor activities to develop the CRP shall include conducting a review of site information provided by the AF.

1.3 Project Activities

The Contractor shall conduct the following tasks to achieve the purposes stated herein, in compliance with approved scoping documents, the Handbook, and all applicable regulations and requirements.

1.3.1 **Community Relations.** Provide support to the base public affairs office for the tasks described below pertaining to the RI/FS Community Relations Program.

1.3.1.1 Public meetings and workshops. The Contractor shall be responsible for coordinating public meetings and workshops for all DEW Line Sites and Cape Lisburne AFS. This includes producing briefing scripts, slides and any associated products such as response cards and sign-in sheets. As requested by the base Community Relations office in coordination with the RTC, research and provide materials for public queries, news media queries, and news releases. Assume a maximum of one (1) workshop/meeting (Seq. nos. 3,9).

1.3.1.2 Public notices. As required by the base Community Relations office and the RTC, the Contractor shall prepare and publish public notices for the Fairbanks and local newspapers. The purpose of these notices is to inform the public of a meeting, workshop, or comment period in which they have the opportunity to be involved in the IRP Program at DEW Line Sites and Cape Lisburne AFS. Also, these notices may be utilized to inform the public of other pertinent program information such as quarterly notices of documents placed in the information repositories. The format for the notices shall be coordinated with the Community Relations office and RTC, and then submitted to the RTC for review prior to delivery to the base. Assume a maximum of two (2) notices (Seq. no. 3).

1.3.1.3 Photo Notebook. The Contractor shall develop a photo notebook which focuses on the overall IRP program at DEW Line Sites and Cape Lisburne AFS. The layout of the notebook will be coordinated with the public affairs office and RTC. Assume a maximum of one (1) update (Seq. no. 9).

1.3.1.4 Mailing List. In coordination with the base Community Relations office and the RTC, prepare and update the mailing list on a quarterly basis. Assume a maximum of two (2) updates (Seq. no. 3).

1.3.1.5 Maps. Prepare presentation quality maps of the installations and their sites to use in newsletters and to distribute to the public.

1.3.1.6 Information Repository/Administrative Record. Prepare a listing of all documents required for the Information Repository and Administrative Record. Create an Information Repository and Administrative Record. The Repository and Record will be maintained by the 11 CEOS/CEVR Community Relations Coordinator. Assume two locations for the Repository and Record, one in Anchorage and another in Elmendorf AFB, AK. Actual locations will be determined by the 11 CEOS/CEVR Community Relations Coordinator.

1.3.2 **Literature Search.** Conduct a literature search and analyze aerial photos of the DEW Line Sties to supplement existing information that has been collected. The purpose of the literature search is to complete the conceptual site model so that a numerical estimate of risk can be developed.

1.3.3 **Presurvey.** Within eight weeks of the issuance of an order, the Contractor shall visit the Dew Line Sites and Cape Lisburne to ensure complete understanding of site conditions. Coordinate this visit with the RTC and the 11 CEOS project manager. The Contractor shall look for evidence of contamination at each site visited (e.g., leaking drums, vegetative stress, leachate seeps). The Contractor shall observe the physical settings of each site visited to formulate specific recommendations concerning boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. The findings of the presurvey shall be used to prepare the Work Plan, SAP, and HSP for the RI and to prepare scoping documents for the treatability study(ies). Assume one presurvey and one reconnaissance trip.

1.3.4 **Quality Assurance/Quality Control (QA/QC).** A QA/QC program shall be conducted and documented for all work pursuant to this delivery order. Contractor and project-specific documents concerning QA/QC procedures and requirements shall be strictly followed. Data generated under the QA/QC program shall be used by the Contractor for evaluating the analytical results and field records assembled for each site to identify accurate and validated data that may be used to assess risk, develop conceptual site models and evaluate alternatives.

1.3.5 **Conceptual Site Model.** Use all available RI/FS data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to refine, based on newly collected data, the conceptual site model. The model shall define the nature and extent of contamination and the transport and fate of those contaminants. The minimum requirements of the model are given in section 2 of the Handbook. The complexity and detail of the site model shall be consistent with the nature of the site and site problems, and the amount of data available the conceptual site model shall be documented in the Work Plan.

1.3.6 [illegible]s **Evaluation.** The Contractor shall identify all Applicab[illegible] or R[illegible]vant and Appropriate Requirements (ARAR). These ARARs will be docume[illegible] Work Plan.

1.3.7 **Data Collection, Sampling, and Analysis Procedures.** The Contractor shall conduct field activities, sampling, laboratory analysis, and data quality assessment. Section 2 of the Handbook is recommended for the Contractor to follow. The Contractor shall conduct all activities in accordance with the WP and the SAP approved by the COR. The COR shall be notified in writing of any planned deviation from the activities specified in these documents. COR approval of deviations is required prior to performance. The Contractor shall ensure that all analyses and analytical methods' QA/QC requirements are being met at all times before and during the analysis of samples.

The field investigation (including all drilling and sampling operations) shall be supervised by a registered geologist, hydrogeologist, or professional engineer. If required by the state, the on-site field supervisor shall be certified by the state to install test wells. A detailed log of field conditions, materials penetrated during drilling, well completion, and sampling conditions, as described in Section 2 of the Handbook, shall be maintained and made available for Government inspection upon request. Decisions on well and boring locations, well depths, screened intervals, and all details of the field investigation shall be made by the COR, and the Contractor's field or project supervisor.

1.3.8 **Regulatory Requirements and Permits.** All well drilling, development , sampling, laboratory analysis, and other activities pursuant to this effort shall be conducted in strict accordance with all applicable federal and state laws, ordinances, rules and regulations, and all authorities with jurisdiction over such activities. The Contractor shall complete permits, applications, other documents, and proficiency tests required by the regulatory agencies. The Contractor shall file documents with appropriate agencies and pay all applicable permit and filing fees. The Contractor shall identify locations requiring permits to Radar Station Manager. The Contractor shall include all correspondence in appendices to the technical reports in accordance with Section 4 of the Handbook.

All laboratory analyses shall conform to all applicable federal, state, and local regulatory agency requirements. If the requirements specify that certification is necessary to conduct one or more specific analyses, the Contractor shall furnish documentation showing laboratory certification with the first set of analytical data supplied to AFCEE/ESR and the COR.

The Contractor shall containerize and sample materials suspected to be hazardous in accordance with applicable requirements, Guidance from the Handbook, and the approved Plans. The Contractor shall transport these containerized materials to a location within the installation boundary designated by the Radar Station Manager at a frequency specified by the

Station Manager. The Contractor shall handle, store, and/or dispose of potentially hazardous materials. The Contractor shall transport and empty containerized materials determined not to be hazardous to locations within the installation boundary identified by the Station Manager.

1.3.9 **Remedial Investigation (RI).** The Contractor shall conduct a RI to characterize environmental conditions; define the concentration, nature, and extent of contamination; and quantitatively estimate the risk to human health and the environment and study the area through the collection of geologic and hydrologic data, environmental samples, the laboratory analyses of those samples for potential contaminants, the evaluation of the analytical results and field measurements with respect to quality control data, and the interpretation and analysis of accurate and precise data. The purpose of data collection, sample collection, and laboratory analysis is to determine whether any contaminants generated from installation activities have entered the environment. The field investigation is used to determine the source of any identified contaminants, the magnitude of contamination relative to Applicable or Relevant and Appropriate Requirements (ARARs), and any naturally occurring or background concentrations for specific compounds. The RI shall comply with the specifications, procedures, and methodologies presented in the project-specific SAP. The COR must be notified in writing prior to any modification of or deviation from any activity described in these documents.

1.3.9.1 **Soil Borehole Drilling and Sampling and Well Installation and Sampling.** The Contractor shall drill and collect samples from boreholes as specified in the SAP. The Contractor shall evaluate the need to install, sample, and develop monitoring or extraction wells.

1.3.9.1.1 **Lithologic Samples.** The Contractor shall describe core samples at least every five (5) feet of drilling or at each change in lithology, whichever is less, to indicate significant changes in lithology of characteristic properties that relate to the strata penetrated. Any deviations shall be coordinated with the COR. Guidance for standard identification practices are found in the Handbook. The Contractor shall include in the field logbook observations made by the driller and rig geologist during drilling such as depth to water, penetration rate, drill rig behavior, and other observations that might be indicative of changes in formation characteristics. The Contractor shall record depth to permafrost in all the soil borings and shall not proceed beyond five (5) feet into the permafrost layer.

1.3.9.1.2 **Drill Cuttings and Drilling Fluids.** The Contractor shall containerize all drill cuttings and drilling fluids. All drill cuttings and drilling fluids shall be managed and disposed of in accordance with the project SAP. (Note: The Contractor shall be responsible for providing all necessary containers.) The Contractor shall be responsible for the logistics of the ultimate disposal of all drill fluids or drill cuttings deemed hazardous in accordance with current EPA off-site disposal policy and state and/or local hazardous waste disposal laws. The contractor shall coordinate with the Station Manager for on-site placement and disposal of all drill cuttings, fluids, purge fluid, and excavated material. If on-site disposal is excluded, all hazardous waste shall be transported by a permitted hazardous waste transporter to a licensed Resource Conservation and Recovery Act (RCRA) approved facility and be accompanied by a Uniform Hazardous Waste Manifest. The Contractor shall provide a final, completed copy of the hazardous waste manifest to the 11 CEOS/CEVR. The Radar Stations' hazardous waste managers will sign all hazardous waste manifest documents.

1.3.9.1.3 **Well/Boring Precautions.** The Contractor shall mark the field locations of all borings during the planning/mobilization phase of the field investigation. The Contractor shall consult with base personnel to minimize the disruption of base activities, to properly position wells with respect to site locations, and to avoid penetrating underground utilities. The Contractor shall obtain all permits prior to commencement of digging and drilling operations. The Contractor shall utilize a registered land surveyor in determining the elevations and locations of all off-base background study borings. All borings and wells from which samples are taken shall be surveyed by the Contractor for vertical and horizontal control. The Contractor shall record the positions on project and site specific maps. Bench marks used must have been previously established from and be traceable to a U. S. Coast and Geodetic Survey (USCGS) or U. S. Geological Survey (USGS) survey marker. Clearly identify all bench mark locations on the base map.

1.3.9.1.4 **Water-Level Measurements in Boreholes.** The Contractor shall measure water levels in all boreholes after the water level has stabilized. Include this information and the date of measurement in the boring logs. Also, record soil moisture conditions (moist, wet, saturated, etc.) in the boring log.

1.3.9.1.5 **Air Monitoring During Drilling.** The Contractor shall monitor the ambient air in the breathing zone above the borehole during all drilling with an appropriate organic vapor analyzer to identify potentially hazardous and/or toxic vapors. Include air monitoring results in borehole logs.

1.3.9.1.6 **Subsurface Soil Sampling.** The Contractor shall collect soil samples from borings as specified in the SAP. The SAP specifies the analytical methods, the parameters for analysis, and the estimated number of analyses for soil samples.

1.3.9.1.7 **Well Construction Requirements.** The Contractor shall coordinate with the COR to determine well completion requirements (flush or projected above ground surface). All wells shall be secured as soon as possible after drilling. The Contractor shall provide corrosion resistant locks for both flush and above-ground well assemblies. The locks shall be compatible with existing wells. The Contractor shall turn the lock keys over to 11 CEOS/CEVR POC following completion of the field effort. The Contractor shall coordinate with the 11 CEOS/CEVR POC, the RTC, and the COR the selection of exact well and screen placement, gravel pack design, and screen slot size.

1.3.9.1.8 **Well Logs.** For each well, the Contractor shall prepare a well completion log and schematic diagram showing well construction details. Lithologic descriptions, well elevation survey data, and other information included in the well logs shall conform to the specifications of the SAP.

1.3.9.1.9 **Well Development.** The contractor shall develop each well as soon as possible. Guidance for well development procedures are found in the Handbook. The Contractor shall measure the rate of water production, pH, specific conductance, and water temperature during well development.

1.3.9.1.10 **Well Placement.** The Contractor shall avoid installing wells in depressions or areas subject to frequent flooding and/or standing water. If wells must be installed in such areas, the Contractor shall design the wells so standing water does not leak into the top of the casing or cascade down the annular space.

1.3.9.1.11 **Well and Borehole Clean-up.** The Contractor shall clean the area following the completion of each well and borehole. The Contractor shall return all sites to the original condition of the site.

1.3.9.1.12 **Groundwater and Surface Water Sampling.** The Contractor shall collect groundwater and Surface Water samples from newly developed well and existing wells and from surface water bodies. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for groundwater and surface water samples.

1.3.9.1.13 **Composite Sampling.** The Contractor shall collect and analyze drill cuttings, fluids, purge fluids, and excavated material. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for composite samples.

1.3.9.2 **Geophysical Surveys.** The Contractor shall evaluate whether geophysical surveys are needed (e.g., to determine boundaries of landfills, to locate underground debris, utilities and storage tanks). Where geophysical surveys are appropriate, the Contractor shall select a geophysical survey technique or techniques [such as ground penetrating radar (GPR), magnetometer or electromagnetic surveys (EM)] that will best meet the desired application. The technique(s) used shall be approved by the RTC prior to use. Approximate number of surveying days is included in Annex A which is to be used for costing purposes only. Appropriate grid systems shall be established and the Contractor shall use the results of this survey to prepare a contour map of the results. Provide this map as an attachment to the first R&D Status Report submitted after the completion of the geophysical surveys. The Contractor shall perform the geophysical surveys before drilling and use the results in selecting the location of soil borings, wells, test pits, if necessary.

1.3.9.3 **Permeability Testing.** The Contractor shall determine the need for a permeability test at Cape Lisburne AFS, to provide additional data on the hydrogeologic characteristics of the water table aquifer. The SAP shall specify the method to be used for the permeability test.

1.3.9.4 **Water Level Measurement.** The Contractor shall evaluate the need for conducting a complete round of water level measurements in all existing and new wells at Cape Lisburne AFS at the beginning of field work and during the field sampling effort. Data gathered shall be used for interpreting groundwater flow directions and groundwater gradient.

1.3.9.5 **Soil Gas Surveys.** The Contractor shall evaluate the need for soil gas surveys and Hydropunch (e.g., to select soil boring locations). If soil gas surveys and hydropunch are included as part of the approved Work Plan and FSP, the Contractor shall establish appropriate grid systems. The Contractor shall prepare a posting map of soil gas values relative to their location on the grid used. Provide this map as an attachment to the first R&D Status Report submitted after completion of the soil gas survey (sequence 3, para 6.1). Approximate number of surveying days are included in Annex A which is to be used for costing purposes only.

1.3.9.6 **Groundwater Field Screening.** The Contractor shall perform groundwater field screening. The SAP shall specify the method, location, and type of groundwater field screening.

1.3.9.7 **Baseline Risk Assessment.** The Contractor shall use data supported by acceptable QA/QC results (as measured against QAPP requirements) and the conceptual site model to numerically estimate the risk posed by site contaminants to human health and the environment. The Contractor shall identify and list all ARARs for those contaminants detected in environmental

samples at the site. The Contractor shall provide ail ARARs evaluations as an attachment to the Technical Report. Provide the results of the baseline risk assessment in the Technical Report using the formats in Section 4 of the Handbook as a guidance.

The Contractor shall identify those sites posing minimal or no threat to human health, welfare, or the environment and for which no further action is appropriate.

The Contractor shall use the results of the risk assessment in establishing remedial action objectives and developing remedial alternatives in the Feasibility Study.

1.3.9.8 **Defense Priority Model Scores.** The Contractor shall use the Defense Priority Model to score the sites. The score shall be included as an appendix to the RI/FS Technical Report.

1.3.9.9 **Fate and Transport.** The Contractor shall perform fate and transport modeling for contaminants of interest to include the projection of future contaminant concentrations within the boundaries of the site. This will be done in conjunction with the RI/FS report.

1.3.10 **Feasibility Study (FS).** The Contractor shall perform a FS concurrently with the RI. As much of the FS as possible shall be performed early in the RI/FS process and refined as additional RI data are obtained. The Contractor shall use the information from the RI and the baseline risk assessment to develop and evaluate remedial action alternatives for each site where a threat to human health or the environment exists. The Contractor shall follow the procedures specified in USEPA OSWER Directive 9355.3-01, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA." The Contractor shall employ streamlining methods wherever possible and develop and evaluate the minimum number of alternatives needed to provide a range of promising treatment and containment actions. The Contractor shall eliminate impracticable alternatives from further consideration early in the FS process. The scope and level of detail shall be consistent with the nature and complexity of site problems.

1.3.10.1 **Develop and Screen Alternatives.** The Contractor shall establish remedial action objectives and remediation goals for protecting human health and the environment. These objectives and goals shall be determined based on identified ARARs and acceptable exposure levels as defined in the baseline risk assessment and refined throughout the RI/FS process. Identify general response actions and applicable technologies based on site and contaminant conditions, and combine technologies to formulate distinct alternatives. The Contractor shall develop alternatives which eliminate, control, and /or reduce risk to human health or the environment to acceptable levels for each pathway. Where a wide variety of promising alternatives exists, the Contractor shall screen the alternatives based on effectiveness, implementability, and cost. The Contractor shall detail the development and screening of the alternatives process and identify the alternatives selected for detailed analysis in the Informal Technical Information Report (ITIR).

1.3.10.2 **Detailed Screening of Alternatives.** The Contractor shall conduct a detailed analysis on each alternative selected and identified in the above step and approved by the COR. Using the methodology in OSWER Directive 9355.3-01, the Contractor shall evaluate each alternative against the nine criteria. In addition to the individual assessment, the Contractor shall perform a comparative analysis to determine the relative performance of alternatives. The Contractor shall focus the analysis on sub-factors and criteria most pertinent to each site and the scope and complexity of the

proposed action. Provide a summary of the Detailed Analysis of Alternatives in the R&D report submitted following task completion. Include summary tables of the individual and comparative analyses that will be used in the Technical Report.

1.3.11 **Decision Documents.** The Contractor shall prepare and submit Decision Documents (DD) following the Handbook Section 4.4 as guidance. The purpose of the DD is to support a remedial action alternative or a no further action alternative. The Contractor shall submit an Interim Decision Document detailing the removal action process, results and conclusions.

1.3.12 **Site Specific Requirements.** The Contractor shall perform the requirements listed in this SOW in conformance with the guidance of the Handbook, requirements of the approved WP, and the SAP. Annex A specifies the proposed values for field and laboratory activities to be conducted, specifications for field activities, information for sediment and soil samples, analytical methods, parameters for analysis, estimated number of analyses for water/sediment/soil samples, required analytical methods, estimated number of analyses for all core samples, estimated number soil gas analyses for each parameter, and field QC sample requirements for soil and water samples for costing purposes only.

1.3.13 **Weekly Field Activity Report**

The contractor shall transmit a Weekly field activity report. The reports shall include, but not be limited to, all field work detailed in this SOW, a listing of any problems encountered (e.g., equipment problems, equipment downtime), and actions taken to resolve those problems. ~~The AFCEE RTC shall develop the format for the report.~~

1.3.14 **Removal Actions**

The Contractor shall complete the following tasks to remove or otherwise control source contamination and further characterize site conditions at Cape Lisburne LRRS. The Contractor shall include any data generated during these activities in the pertinent reports.

1.3.14.1 **Task 1** involves placement of an interceptor trench (French drain) below Petroleum, Oil, and Lubricant (POL) Tanks 1 and 2 to capture spilled or leaked petroleum products which are currently migrating through the subsurface toward a nearby surface water body. Collected material shall drain to a sump for separation into its water and petroleum components. Accumulated water shall be treated using granulated activated carbon or appropriate vapor control technology, chemically analyzed for the presence of remaining contaminants, and subsequently, in coordination with Alaska Department of Environmental Conservation (ADEC), disposed of according to all applicable water regulations. Recovered petroleum product will be incinerated on-site, after coordination ADEC. Soils excavated to accommodate the trench may be returned to the surrounding land, provided that they are not considered hazardous under the RCRA "contained-in" policy. Soils which are deemed hazardous may be drummed and sent for off-site disposal according to applicable hazardous waste regulations, or may be stored on-site pending subsequent remedial activities.

1.3.14.2 **Task 2** requires the removal and off-site disposal of a sludge pile located at Landfill and Waste Accumulation Area Number 1. Using a backhoe provided by the base, the sludge pile shall be excavated,

containerized in 55-gallon drums, and transported to a disposal facility in the continental U.S. A temporary drum staging area shall be established nearby to store the drums until they are transported. Current plans may involve shipment of waste on the barge's return trip to Cape Lisburne. Prior to field operations on this task, a representative sample of the sludge must be collected and analyzed using TCLP and other characteristic methods to determine if the material is a hazardous waste. The sludge must be managed and disposed of according to the results of such analyses. After removal of the sludge, the excavated area must also be sampled and analyzed to detect any constituents remaining at the site.

1.3.14.3 **Task 3** involves limited PCB sampling and analysis. The purpose of this task is twofold: to further characterize contamination in ocean sediments adjacent to Landfill and Waste Accumulation Area Number 1, and to locate a reported "hot spot" undiscovered during the 1993 RI/FS sampling program.

1.4 Project Deliverables

Deliver the following documents in compliance with the requirements of item VI, the formats required in section 1 and 4 of the Handbook, and the specifications noted below. Draft reports are considered "drafts" only because they have not been reviewed and approved by the Air Force. In all other respects, "drafts" shall be complete, in the proper format, fully illustrated, and free of grammatical and typographical errors.

1.4.1 Scoping Documents.

a. Engineering Network Analysis (GANTT) (para 1.2.1). Provide within ten (10) days after the issuance of an order. Update and submit quarterly (sequence 3, para 6.1).

b. Work Plan (para 1.2.2). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

c. Sampling and Analysis Plan (1.2.3). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

d. Health and Safety Plan (para 1.2.4). Provide within six (6) weeks after the issuance of an order (sequence 4, para 6.1).

e. Community Relations Plan (para 1.2.5). Provide within eight (8) weeks after issuance of an order (sequence 4, para 6.1).

1.4.2 **Special Notification.** Provide written notification of imminent health hazards and supporting documentation within three (3) days of telephone notification (sequence 16, para 6.1).

1.4.3 **Presentation Materials.** The Contractor shall prepare and present up to two (2) presentation packages at meetings coordinated by the Air Force (sequence 9, para 6.1). Attendance of these meetings is included in paragraph 1.1.3 of this SOW. As part of the presentation materials, the Contractor shall provide paper copies of all slides and overheads.

1.4.4 **Meeting Summaries** (para 1.1.3). Provide no later than five (5) days after conclusion of each meeting (sequence 18, para 6.1).

1.4.5 **Newsletter.** Prepare and submit a quarterly newsletter which presents the status of the entire base IRP Program. This will include preparing an outline resulting from input by all Contractors involved in the program. The outline must be approved by the base and RTC prior to submittal of the newsletter. The final product will be printed and distributed as agreed to by the RTC. Assume a maximum of two (2) newsletters (Sequence no. 3).

1.4.6 **Fact Sheets.** As required by the base IRP Program, prepare and submit fact sheets which facilitate the public's understanding of the IRP Program. These sheets should include key community concerns regarding sites as specified by the base. Use the format agreed to by the base and RTC. Print and distribute the fact sheets as agreed to by the RTC. Assume a maximum of two (2) fact sheets (Sequence no. 3).

1.4.7 **Public Notices.** In accordance with paragraph 1.3.6.2, prepare and submit public notices for the Fairbanks and local newspapers. Use the format agreed to by the base and RTC (Sequence no. 3).

1.4.8 **Photo Notebook.** In accordance with paragraph 1.3.6.3, develop a photo notebook which focuses on the overall base IRP Program. The Contractor shall include photos of sites under investigation, field and removal activities, and sample locations. Photos shall reflect proper sampling techniques, QA/QC procedures, and Health and Safety reports during field activities. Prior to implementation, submit a conceptual layout of the notebook for review by the base and RTC (Sequence no. 9).

1.4.9 **Mailing List.** In accordance with the base Community Relations coordinator and paragraph 1.3.6.4, update the existing mailing list on a quarterly basis (Sequence no. 3).

1.4.10 **Maps.** In accordance with the base community Relations coordinator and paragraph 1.3.6.5, prepare presentation quality maps.

1.4.11 **Information Repository/Administrative Records.** Submit the Information Repository and Administrative Records in accordance with Air Force Guidance and in concurrence with the COR and the base Community Relations Coordinator. (sequence no. 4, para 6.1)

1.4.12 **Data Management.** The Contractor shall meet the data deliverable requirements of the Installation Restoration Program Information Management System (IRPIMS). The Contractor shall be responsible for recording field and laboratory data into a computerized format as required by the most current version of the IRPIMS Data Loading Handbook (mailed under separate cover). In order to perform this task, the Contractor shall use the IRPIMS Quality Control Tool (QC Tool) and PC software utility (mailed under separate cover with software manual) to quality check ASCII data files and to check all data files for compliance with requirements in the IRPIMS Data Loading Handbook. Upon request, the IRPIMS Contractor Data Loading Tool (CDLT) is available. This PC software is designed to assist the Contractor in preparing the various ASCII data files.

Individual IRPIMS data files (e.g., analytical results, groundwater level data, etc.), including resubmissions, shall be delivered with a transmittal letter by the Contractor to the Air Force Center for Environmental Excellence (AFCEE) in sequence according to a controlled time schedule as identified in the current version of the IRPIMS Data Loading Handbook. The Contractor shall include a copy of the Quality Control Tool error report, i.e., output from the QC tool, for each IRPIMS file submission. The error report shall be

submitted both in hard copy and as an electronic file on the submission disks with the filename of the error report identified in the transmittal letter (SEQUENCE No. 3).

All Contractor data deliverables shall be sent to:

AFCEE/ESD BLDG 624W
ENVIRONMENTAL RESTORATION DIVISION
ATTN: IRPIMS Data Management
Brooks AFB, TX 78235-5000

In addition, the Contractor shall provide a copy of the transmittal letter to the Air Force contracting office responsible for the contract, HSC/PKV (Brooks AFB, TX, 78235-5000) for AFCEE contracts. This letter shall identify the files included or otherwise omitted (with an appropriate explanation), the Government contract and delivery order number, and the Air Force POC that is responsible for monitoring the Government contract.

The Contractor shall be responsible for the accuracy and completeness of all data submitted. All data entered into the IRPIMS data files and submitted by the Contractor shall correspond exactly with the data contained in the original laboratory reports and other documents associated with sampling and laboratory contractual tasks.

Each file delivered by the Contractor will be electronically evaluated by AFCEE/ESD for format compliance and data integrity in order to verify acceptance. All files delivered by the Contractor are required to be error-free and in compliance with the IRPIMS Data Loading Handbook. Any errors identified by AFCEE/ESD in the submission shall be corrected by the Contractor.

1.4.13 **Decision Document.** The Contractor shall prepare and submit DD as described in Section 1.3.11 (SEQUENCE No. 4, para 6.1).

1.4.14 **Technical Reports.** Summarize the findings of the tasks pursuant to the SOW, integrate them with the results of all pertinent previous studies, and formulate conclusions and recommendations for future efforts in Technical Reports.

1.4.14.1. **Remedial Investigation (RI) Report** (para 1.3.3). Provide a RI Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.2. **Risk Assessment (RA) Report** (para 1.3.3.7). Provide a RA Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.3 **Feasibility Study Report** (para 1.3.4). Provide a Feasibility Study Report following the format in section 4.0 of the Handbook. (sequence 4, para 6.1).

1.4.14.4 **RI/FS Technical Report** (para 1.3.3). Provide a RI/FS Technical Report following the format in section 4.0 of the Handbook. The RI/FS Technical Report shall integrate the RI, RA, and FS reports. Provide two microfiche copies with the final RI/FS Technical Report (sequence 4, para 6.1).

1.4.15 **Basewide Comprehensive IRP Document.** The Contractor shall develop a comprehensive document that summarizes both the historic and projected IRP activities. This document shall be used as management tool to efficiently guide future IRP activities at the DEW Line Sites and Cape Lisburne AFS. The Contractor shall follow the outline developed by the AFCEE RTC. Assume two (2) updates (sequence no. 4)

1.4.16 **Analytical Data ITIR.** Prepare and submit the following ITIRs, as well as the Analytical Data ITIR itself:

a. Development & Screening of Alternatives (para. 1.3.10.1). Submit the results of the development and screening of alternatives in an ITIR prepared in compliance with section 3 of the Handbook (sequence 3, para 6.1)

b. Detailed Screening of Alternatives (para 1.3.10.2).

c. DPM Scoring (para 1.3.9.8). Provide scores, a summary of procedures and assumptions, and Automated DPM output tables for all sites scored with DPM (sequence 3, para 6.1).

d. Mylar[R] Map. Construct Radar Stations' maps of Mylar using guidelines in section 3 of the Handbook. The Maps shall contain all sites and related water and sediment sampling locations (sequence no. 3, para. 6.1). The Contractor shall create and update digitized map files. Use the digitized data file to produce the Mylar map. The Contractor shall print the revision date on the Mylar maps and the date shall be encoded in the digitized data file. Provide a copy of the revised digitized data file to AFCEE-ESO/ER (sequence 1, para. 6.2).

e. Geophysical Survey Contour Map (para 1.3.9.2). Provide a contour map showing geophysical survey results. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

f. Soil Gas Map (para 1.3.9.5). Provide site maps showing soil gas data superimposed on the sampling locations and incorporate soil gas data generated by the 11 CEOS/CEOR. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

g. Site Characterization Summary Informal Technical Information Report (SCS ITIR). The Contractor shall prepare the report to include the following components:

1. Source identification and contaminant delineation.

2. Identification and ranking of appropriate treatability studies for the listed sites.

3. Data and interpretations integrating the findings of the current study and all previous RI efforts at the sites.

4. Current isoconcentration plots of contaminants detected at each site, lithologic logs of each boring showing contaminants detected and relationship to other borings in the site, and cross-sections of the site showing contaminant distribution.

5. The contents and objectives of a Site Characterization Summary Informal Technical Information Report (ITIR) are specified in the Handbook. The Site Characterization Summary ITIR shall serve as a core document for the RI report. The Contractor shall submit an annotated outline of each section of the

ITIR for approval by the TPM prior to preparation of the report itself. The Contractor shall prepare the report as specified in the accepted annotated outline. The Contractor shall submit newly revised portions of the working draft ITIR in order to make available current site characterization data. A prime objective shall be to minimize the volume of comments on the working draft and final submittals by incorporating comments into the report in an on-going manner. The final summary shall contain all sites included in this effort (Sequence No. 4).

h. Weekly Field Activities Report (para 1.3.13). Transmit a Weekly field activities report during field activities pursuant to a format developed by the AFCEE RTC. (Sequence no. 4, para 6.1)

II. Site Location and Dates

Dew Line Sites and Cape Lisburne, date to be established.

III. Base Support The base will:

3.1 Provide the Contractor with existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of IRP sites under investigation.

3.2 Arrange for personnel identification badges, vehicles passes, and/or entry permits with the contention the Contractor will provide necessary information to the base personnel no less than four weeks before needed.

3.3 Provide the Contractor with all previously approved documents which provide information on all IRP efforts conducted at Dew Line Sites and Cape Lisburne and will aid in the determination of the amount of field work and analyses which need to be conducted.

IV. Government Furnished Property
Not Applicable

V. Government Points of Contact:

~~5.1 MAJCOM Coordinator~~

~~Major James R. Williams III~~
~~AFCEE/ERD~~
~~8001 Inner Circle DR STE 2~~
~~Brooks AFB TX 78235-5328~~
~~(210) 536-5243~~
~~DSN 240-5243~~
~~(210) 536-9026 FAX~~
~~DSN 240-9026~~

~~5.2 Restoration Team Chief~~

~~Mr. Michael F. McGhee~~
~~AFCEE/ERD~~
~~8001 Inner Circle DR STE 2~~
~~Brooks AFB TX 78235-5328~~
~~(210) 536-5293~~
~~DSN 240-5293~~
~~(210) 536-9026 FAX~~
~~DSN 240-9026~~

~~5.3 Base Point of Contact (POC)~~

~~Mr. Jim Wolfe~~
~~11 CEOS/CEVR~~
~~21885 Second Street~~
~~Elmendorf AFB AK 99506-4420~~
~~(907) 552-4532~~
~~DSN 317-552-4532~~
~~(907) 552-1533 FAX~~
~~DSN 317-552-1533~~

~~5.4 Public Affairs Coordinator~~

~~Ms. Wende Wolf~~
~~11 CEOS/DEVR~~
~~21885 Second Street~~
~~Elmendorf AFB AK 99506-4420~~
~~(907) 552-4532~~
~~DSN 317-552-4532~~
~~(907) 552-1533 FAX~~
~~DSN 317-552-1533~~

VI. Deliverables

6.1 Attachment 1 of the Basic Contract

Sequence numbers 1 and 5 listed in attachment 1 to the basic contract apply to all orders. Guidance for preparing R&D Status Reports (sequence 1) is contained in the Handbook, section 4. In addition, the sequence numbers and dates listed below are applicable to this order:

Sequence No.	Para No.	Block 10 (freq.)	Block 11 (as of date)	Block 12 (date of 1st. submit.)	Block 13 (date of final report)	Block 14 (no. of copies)
3 (NETWORK ANALYSIS)	I.1.4.1a	QTRLY	12APR93	30APR93	a	4
4 (WORK PLAN)	I.1.4.1b	ONE/R	12APR93	30MAY93	30JULY93	b
4 (WORK PLAN ADDENDUM)	I.1.4.1b	ONE/R		2WKSDOA	15SEPT94	m
4 (SAP)	I.1.1.4c	ONE/R	12APR93	30MAY93	30JULY93	b
4 (SAP ADDENDUM)	I.1.4.1c	ONE/R		3WKSDOA	15SEPT94	n
4 (HSP)	I.1.4.1d	OTIME	12APR93	30MAY93	-	10
4 (HSP ADDENDUM)	I.1.4.1d	OTIME		2WKSDOA		5
4 (COMM. REL. PLAN)	I.1.1.4e	ONE/R	12APR93	30MAY93	31DEC93	b
16 (SPECIAL NOTIF.)	I.1.4.2	OTIME	c	c	-	3
9 (PRESNT. MATERIAL)	I.1.4.3	ASREQ	d	d	-	10
18 (MTG. RPTS)	I.1.4.4	ONE/R	e	e	-	5
3 (NEWSLETTER)	I.1.4.5	QTRLY	12APR93	30NOV93	a	f
3 (FACT SHEETS)	I.1.4.6	ASREQ	12APR93	15JUL93	g	-
3 (PUBLIC NOTICES)	I.1.4.7	ASREQ	12APR93	15JUL93	g	h
9 (PHOTO NOTEBOOK)	I.1.4.8	OTIME	12APR93	15JUL93	-	l
3 (MAILING LIST)	I.1.4.9	QTRLY	12APR93	15JUL93	a	-
3 (MAPS)	I.1.4.10	OTIME	12APR93	15JUL93	-	2
4 INFO REPOS	I.1.4.11	OTIME	31JUL93	-	31JAN94	2
3 (IRPMS Data ITIR) (Data Management) BCHCON BCHLDI BCHSLI BCHWCI BCHSAMP BCHCALC BCHLTD BCHTEST BCHRES BCHGWD	I.1.4.12	OTIME	31JUL93	31JAN94	31MAR94	2
4 DECISION DOC	I.1.4.13	ONE/R	i	i	31OCT94	b
4 RI REPORT	I.1.4.14.1	ONE/R	15SEP93	15FEB94	30APR94	b
4 RISK ASSESSMENT	I.1.4.14.2	ONE/R	1OCT93	16MAY94	15JUL94	b
4 FEASIB. STUDY	I.1.4.14.3	ONE/R	30SEPT93	30AUG94	-	b
4 RI/FS Report	I.1.4.14.4	ONE/R	30SEP93	30SEP94	1JAN95	b
4 IRP DOCUMENT	I.14.15	ONE/R	31JUL93	31OCT93	10DEC93	b
3 ANALYTICAL DATA ITIR		OTIME		01DEC94		2
3 SCREENING ALTER ITIR	I.1.4.16a	OTIME	30SEP93	30DEC93	-	10
3 DETAL ANALYSIS ALTER ITIR	I..1.4.16.b	OTIME	28 FEB94	30MAR94	-	10
1 DPM SCORING	I.1.4.16c	OTIME	30SEP93	j	j	3
3 MYLAR MAP	I.1.4.16d	OTIME	k	k	-	5
3 GEOPHYS CONT	I.1.4.16.e	OTIME	l	l	-	10
3 SOIL GAS MAP	I.1.4.16f	OTIME	l	l	-	10
4 SCS ITIR	I.1.4.16g	ONE/R	-	01FEB95	01APR95	o
~~4 SCS ITIR~~	~~I.1.4.16g~~	~~ONE/R~~	~~15SEP93~~	~~30NOV93~~	~~15FEB94~~	5
4 WEEKLY ACT REP	I.1.4.16h	WEEKLY	13AUG93	13AUG93	-	1

6.2 Reserved.

6.3 Notes

a. Submit Quarterly Thereafter.

b. One (1) first draft plan (8 copies), one (1) second draft plan (8 copies), and one (1) final plan (10 copies) are required. Incorporate Air Force comments into the second draft and final plan as specified by the RTC. Supply AFCEE/ESR with an advance copy of the first draft, second draft, and final plan for acceptance prior to distribution. Distribute the remaining copies of each plan as specified by the RTC. The second and final reports shall be submitted within three (3) weeks of receipt of comments from the RTC.

c. Primary and Secondary Documents. One first draft report (25 copies), one second draft report (25 copies), and one final report (35 bound copies plus the original camera-ready copy and a 3.5 inch disk formatted in WordPerfect 5.1 containing the document file) are required. Incorporate Air Force comments into the second draft and final reports as specified by the RTC. Supply the RTC with an advance copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute the remaining copies as specified by the RTC .

d. Provide written notice with supporting documentation within three (3) days of telephone notification and at the direction of the RTC. Assume a maximum of 100 pages.

e. Provide within one (1) week of task/meeting completion.

f. Provide 500 copies of the Newsletters and distribute as agreed to by the RTC. This includes mailing the final product to on-base personnel and addresses on the existing mailing list.

g. Provide draft and final deliverables. Provide two advance copies to the AFCEE RTC and to the 11 CEOS Community Relations Coordinator for acceptance prior to preparation of the final deliverables.

h. Provide poster-size map.

i. Submit with the second draft Technical Report.

j. Submit with the Technical Report.

k. Provide with the Technical Report.

l. Provide within four (4) weeks of task completion.

m. Both a draft and a final addendum to the existing work plan is required for the removal actions specified in paragraph I.1.3.14. Field removal activities performed at Cape Lisburne LRRS pursuant to paragraph I.1.3.14 of this SOW shall commence upon submittal of the draft work plan to AFCEE for review. The Contractor shall distribute both versions of the work plan as specified by AFCEE.

n. The SAP addendum shall focus on the sampling and analysis activities to be conducted under the removal actions specified in paragraph I.1.3.14 of this SOW. The Contractor shall incorporate any Government comments into the final project-specific SAP. The Contractor shall distribute the SAP as specified by AFCEE.

o. A Site Characterization Summary ITIR must be prepared based on the findings of sampling and analyses conducted pursuant to the removal action specified in paragraph I.1.3.14. The Contractor shall incorporate any Government comments into the final ITIR. The Contractor shall distribute the ITIR as specified by AFCEE.

~~**Notes:**~~

~~a Unless an abbreviated list of analytes is specified under "Parameter" above, the analytical protocol shall include all analytes listed in the referenced analytical method. The methods cited are from the following sources:~~

~~"A" Methods — Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985)~~

~~"E" Methods — Methods for Chemical Analysis of Water and Wastes, EPA Manual, 600/4-79-020 (USEPA, 1983--with additions)~~

~~"SW" Methods — Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (USEPA, 1986)~~

~~"ASTM" Methods — American Society for Testing and Materials, 1919 Race Street, Philadelphia, PA 19103~~

~~b The maximum number of second-column confirmation analyses shall not exceed fifty (50) percent of the actual number of field samples (to include duplicates, replicates, ambient, condition blanks, trip blanks, and equipment blanks). If the number of samples requiring second-column confirmation exceeds this allowance, contact the HSD Technical Project Manager. The total number of samples listed in Tables A-4 and A-5 includes the allowance applicable to each GC method. IF GC/MS, or a combination of second-column GC and GC/MS, is used, the total cost of all such analyses for a particular parameter shall not exceed the funding allowed for positive confirmation using only second-column GC.~~

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 3

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002205	20SEP94	FY7624-94-08822	

7. ISSUED BY CODE FA8900

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIAL COMMAND
HUMAN SYSTEMS CENTER
BROOKS AFB TX 78235-5320

Buyer: EDWIN CUSTODIO HSC/PKVBC
Phone: (210)536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO BALTIMORE
ATTN: CHESAPEAKE
200 TOWSONTOWN BLVD, WEST
TOWSON, MD 21204-5299

DUPLICATE ORIGINAL

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE

IF "9" FOR MULTIPLE FACILITIES SEE SECT "K"

ICF TECHNOLOGY
9300 LEE HIGHWAY
FAIRFAX VA 22031-1207

PHONE:(703)934-3000
COUNTRY:FAIRFAX

MAIL DATE
SEP 23 1994

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1ST % DAYS NET DAYS
2ND % DAYS OTHER IF "9"
3RD % DAYS SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT
MVH/M1E/MVH

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(a) By signing and returning ______ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO ______ THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF ______ IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.232-7 PAYMENT UNDER T&M OR LABOR HOURS

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$ SEE SECTION G			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJECT: INCREASE CEILING AMOUNT/ FUND OVERRUN

PROJECT MANAGER: SAMER N. KARMI, AFCEE/ERDW, BROOKS AFB, TX 78235-5328
FINANCE OFFICE:(SC1030)DFAS-COLUMBUS CENTER, DFAS-CO/CHESAPEAKE DIV
COLUMBUS, OH 43218-2262

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN ______ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

23. NAME OF CONTRACTING OFFICER *(Type or print)*
DEAN M. CARSELLO

24. DATE SIGNED
20 SEP 1994

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to FAR 52.232-7 Payment Under Time-and-Material and Labor-Hours Contracts and in accordance with the provisions of the Basic Contract F33615-90-D-4010 and Delivery Order 0022, Mod. 05 the above delivery order is amended. The purpose of this modification is to increase the ceiling amount of this order by $330,000.00 to cover the total cost of the efforts being requested. The ceiling is being increased to cover existing work.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A Cover Page: The ceiling amount in Block 20 (cover page) is increased by $330,000.00 from $3,528,878.00 to $3,858,878.00.

b. SECTION B Supplies/Services: is amended as set forth below.

Item No.	Supplies Schedule	Qty Purch Unit	Unit Price
0001	CLIN Change Sec Class: U Noun: Sampling, Analysis, and Data Acrn: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0002	CLIN Change Sec Class: U Noun: Support Acrn: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0004	CLIN Change Sec Class: U Noun: Chemical Analysis & Data Acrn: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N

pr/mipr data: FY7624-94-08822

b. SECTION G Accounting Classification Data: is amended as set forth below:

ACRN	Acct Class Data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification		Obligation Amount
AD	Account Establish			$330,000.00
	Unclassified	5743400	F74400	
		304 7434 434419 040000 53475 000000 674400		

pr/mipr data: FY7624-94-08822 (PR Complete)

descriptive data: AF Form 616 H94-SR-365 dated: 18 Aug 94 expiration: 22 Sep 94

XA Special ACRN Establish

descriptive data: Special ACRN XA Funds CLINs 0001, 0002, and 0004 and includes the following:

AA:	$ 299,855.00 (Basic DO)
AB:	99,986.00 (Mod. -01)
	2,899,511.00 (Mod. -02)
AC:	229,526.00 (Mod. -04)
AD:	330,000.00 (Mod. -05)
TOTAL	$3,858,878.00

Finance Officer: Pay funds in alphabetical order.

3. Concurrence to this Unilateral Agreement is evidenced by contractor's (ICF) letter dated 8 Jun 94, incorporated herein by reference.

4. All other terms and conditions remain unchanged and in full force and effect.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 4

2. PROC INSTRUMENT ID NO. (PIIN): F33615-90-D-4010
3. SPIIN: 002206
4. EFFECTIVE DATE: 27MAR95
5. REQUISITION/PURCHASE REQUEST PROJECT NO.: FY7624-95-08452
6. DOC/DMS RATING: DO-C9

7. ISSUED BY — CODE FA8900
DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER
8005 9TH STREET
BROOKS AFB TX 78235-5353
Buyer: EDWIN CUSTODIO /PKVBA
Phone: (210) 536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) — CODE S2404A
DCMAO BALTIMORE
ATTN: CHESAPEAKE
200 TOWSONTOWN BOULEVARD, WEST
TOWSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS — CODE 69418 — FACILITY CODE — IF "Y" FOR MULTIPLE FACILITIES SEE SECT "K"
ICF TECHNOLOGY, INC.
9300 LEE HIGHWAY
FAIRFAX, VA 22301-3000

COUNTY: FAIRFAX
PHONE: (703)934-3000

ADVANCE COPY

10. SECURITY CLAS: U

11. DISCOUNT FOR PROMPT PAYMENT
1ST % DAYS
2ND % DAYS
3RD % DAYS
NET DAYS
OTHER IF "Y" SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT: MVH/M1U/MVH

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS
☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(1) By signing and returning ____ copies of this amendment; (2) By acknowledging receipt of this amendment on each copy of the offer submitted; or (3) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS
☐ THIS CHANGE IS ISSUED PURSUANT TO ____ THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.
☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.
☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF ____ IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.
☒ THIS MODIFICATION IS ISSUED PURSUANT TO IAW FAR 52.232-7 PAYMENT UNDER T&M AND LABOR HOURS

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
B			$ SEE SECTION G			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS (Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)
SUBJECT: INCREASE TO THE CONTRACT CEILING PRICE
PROJECT MANAGER: SAMER KARMI, AFCEE/ERD, BROOKS AFB TX 78235-5353
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER, DFAS-CO/CHESAPEAKE DIV
P O BOX 182264, COLUMBUS OH 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN ____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR (Signature of person authorized to sign)

22. UNITED STATES OF AMERICA (Signature of Contracting Officer)
BY Janelle J Larrison

20. NAME AND TITLE OF SIGNER (Type or print)

21. DATE SIGNED

23. NAME OF CONTRACTING OFFICER (Type or print): JANELLE J. LARRISON

24. DATE SIGNED: 95 Mar 27

1. Pursuant to FAR 52.232-7 Payment Under Time-and-Material and Labor-Hours Contracts and in accordance with the provisions of the Basic Contract F33615-90-D-4010 and Delivery Order 0022, Mod. 06 the above delivery order is amended. The purpose of this modification is to increase the ceiling amount of this order by $315,000.00 to cov[illegible] cost of the efforts being requested. The ceiling is being increased to cover existing work in the revised Work Plan.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A Cover Page: The ceiling amount in Block 20 (cover page) is increased by $315,000.00 from $3,858,878.00 to $4,173,878.00.

b. SECTION B Supplies/Services: is amended as set forth below.

Item No.	Supplies Schedule	Qty Purch Unit	Unit Price
0001	CLIN Change Sec Class: U Noun: Sampling, Analysis, and Data Acrn: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0002	CLIN Change Sec Class: U Noun: Support Acrn: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0004	CLIN Change Sec Class: U Noun: Chemical Analysis & Data Acrn: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N

pr/mipr data: FY76-95-08452

c. SECTION F Supplies schedule Data: The delivery schedule is modified as set forth below:

Item No.	Supplies Schedule Data		Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change acrn: XA ship to: U	Sec Class: U	1	96 Jan 31
0002	CLIN Del Sch Change acrn: XA ship to: U	Sec Class: U	1	96 Jan 31
0004	CLIN Del Sch Change acrn: XA ship to: U	Sec Class: U	1	96 Jan 31

b. SECTION G Accounting Classification Data: is amended as set forth below:

ACRN	Acct Class Data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification		Obligation Amount
AE	Account Establish			$315,000.00
	Unclassified	5753400	F74400	
		305 7434 434419 040000 53440 000000 674400		

pr/mipr data: FY7624-95-08452 (PR Complete)

descriptive data: AF Form 616 H95-SR-298 dated: 1 Mar 95, expiration 15 Sep 95.

XA Special ACRN Establish

descriptive data: Special ACRN XA Funds CLINs 0001, 0002, and 0004 includes the following:

AA:	$ 299,855.00	(Basic DO)
AB:	99,986.00	(Mod.-01)
	2,899,511.00	(Mod.-02)
AC:	229,526.00	(Mod.-04)
AD:	330,000.00	(Mod.-05)
AE:	315,000.00	(Mod.-06)
	$4,173,878.00	

Finance Officer: Pay funds in alphabetical order.

3. Concurrence to this Unilateral Agreement is evidenced by contractor's (ICF) letter dated 18 Jan 95, incorporated herein by reference.

4. All other terms and conditions remain unchanged and in full force and effect.

APPENDIX D

SAMPLE COLLECTION LOGS

SAMPLE COLLECTION LOGS FOR THE DRUM STORAGE AREA (ST02)

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-ST02-S01

RADAR STATION: Wainwright WEATHER: Windy to 20 mph, overcast, 40°F

SITE/AOC: Drum Storage Area, ST02 FEET FROM FIXED POINT: 256 MAGNETIC HEADING: 345°

FIXED POINT: Northwest piling on pier.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, DP

TIME SAMPLED: 14:20 DEPTH OF SAMPLE (feet): 0-4"

SAMPLE DESCRIPTION/COMMENTS: Soil, 10-20% sand and silt, light grayish brown, rooted.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-ST02-S02

RADAR STATION: Wainwright WEATHER: Windy to 20 mph, overcast, 40°F

SITE/AOC: Drum Storage Area, ST02 FEET FROM FIXED POINT: 126 MAGNETIC HEADING: 20°

FIXED POINT: Northwest post of dock.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DP, JB

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Soil, rooted, silty and sandy.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-ST02-S03

RADAR STATION: Wainwright WEATHER: Windy to 20 mph, overcast, 40°F

SITE/AOC: Drum Storage Area, ST02 FEET FROM FIXED POINT: 88 MAGNETIC HEADING: 128°

FIXED POINT: Northwest piling on pier.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, DP

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet): 0-3" in beach cliff face

SAMPLE DESCRIPTION/COMMENTS: Mixed layers of small pebbly gravel, sand, clayey silt, all limonitic, collected from base of organic tundra material above clayey silty horizon.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-ST02-S06

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-ST02-S04

RADAR STATION: Wainwright WEATHER: Windy to 20-25 mph, overcast, 40°F

SITE/AOC: Drum Storage Area, ST02 FEET FROM FIXED POINT: 94 MAGNETIC HEADING: 240°

FIXED POINT: Northwestern most post on pier.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, DP

TIME SAMPLED: 14:50 DEPTH OF SAMPLE (feet): 0-3" into cliff face

SAMPLE DESCRIPTION/COMMENTS: Sample collected from base of gravel fill on top of original tundra. Organic material underlain by silty gray clay. One portion collected in the sediments.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-ST02-S05

RADAR STATION: Wainwright WEATHER: Windy to 25 mph, overcast, 40°F

SITE/AOC: Drum Storage Area, ST02 FEET FROM FIXED POINT: 164 MAGNETIC HEADING: 268°

FIXED POINT: Northwestern most post on pier.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, DP

TIME SAMPLED: 15:05 DEPTH OF SAMPLE (feet): 0-3"

SAMPLE DESCRIPTION/COMMENTS: Sandy granular gravel at base of gulley that drains burn area.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED								
ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓			SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-ST02-S06

RADAR STATION: Wainwright WEATHER: Windy to 20 mph, overcast, 40°F

SITE/AOC: Drum Storage Area, ST02 FEET FROM FIXED POINT: 38 MAGNETIC HEADING: 28°

FIXED POINT: Northwest piling on pier.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, DP

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet): 0-3" in beach cliff face

SAMPLE DESCRIPTION/COMMENTS: Mixed layers of small pebbly gravel, sand, clayey silt, all limonitic, collected from base of organic tundra material above clayey silty horizon.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-ST02-S03

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED								
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓			SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE DIESEL FUEL SPILLS (SS04)

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-S01

RADAR STATION: Wainwright WEATHER: Cloudy with a mild breeze

SITE/AOC: Diesel Fuel Spills, SS04 FEET FROM FIXED POINT: ~3 MAGNETIC HEADING: 90

FIXED POINT: Intake end of culvert that drains northwest corner of module train.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, PG, RT

TIME SAMPLED: 15:20 DEPTH OF SAMPLE (feet): Surface to 6"

SAMPLE DESCRIPTION/COMMENTS: The sample material is gravel with some fine sand. The sample has a sheen and a strong smell of petroleum.

SAMPLING METHOD: Scooped into jar

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-SS04-S05

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-S02-1
RADAR STATION: Wainwright WEATHER: Cloudy with a mild breeze, 38°F
SITE/AOC: Diesel Fuel Spills, SS04 FEET FROM FIXED POINT: 176 MAGNETIC HEADING: E along module train
FIXED POINT: Northwest corner of module train.
SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: ML, PG, RT
TIME SAMPLED: 15:10 DEPTH OF SAMPLE (feet): 1
SAMPLE DESCRIPTION/COMMENTS: The sample was collected at a depth of 1 foot. Mostly gravel with some fine sands.

SAMPLING METHOD: Auger and scoop
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES	✓			TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-S03-1

RADAR STATION: Wainwright WEATHER: Cloudy with a mild breeze, 38°F

SITE/AOC: Diesel Fuel Spills, SS04 FEET FROM FIXED POINT: 100 MAGNETIC HEADING: E along south wall of module train

FIXED POINT: Southwest end of module train.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, PG, RT

TIME SAMPLED: 15:55 DEPTH OF SAMPLE (feet): 0.5-1.0

SAMPLE DESCRIPTION/COMMENTS: The material is mostly gravel with some fine sands. Contains a faint petroleum odor.

SAMPLING METHOD: Scooped into jar

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-S04-1

RADAR STATION: Wainwright WEATHER: Cloudy with mild winds, 38°F

SITE/AOC: Diesel Fuel Spills, SS04 FEET FROM FIXED POINT: ~3 MAGNETIC HEADING: 90°

FIXED POINT: Intake of culvert that drains southwest corner of module train.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, PG, RT

TIME SAMPLED: 15:45 DEPTH OF SAMPLE (feet): 8" to 1 foot

SAMPLE DESCRIPTION/COMMENTS: Material is mostly gravel with some fine sands. The material is stained, with a slight petroleum odor.

SAMPLING METHOD: Scooped into jar

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES	✓			TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-S05

RADAR STATION: Wainwright WEATHER: Clear with a mild breeze

SITE/AOC: Diesel Fuel Spills, SS04 FEET FROM FIXED POINT: ~3 MAGNETIC HEADING: 90°

FIXED POINT: Intake end of culvert that drains northwest corner of module train.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, PG, RT

TIME SAMPLED: 15:20 DEPTH OF SAMPLE (feet): Surface to 6"

SAMPLE DESCRIPTION/COMMENTS: The sample material is gravel with some fine sands. The material is stained and has a strong petroleum odor.

SAMPLING METHOD: Scooped into jar

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-SS04-S01

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\SS04-S05

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-S06-1.5

RADAR STATION: Wainwright WEATHER: Partly cloudy, breezy, low to medium 40's°F

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 120 MAGNETIC HEADING: 180°

FIXED POINT: Southwest corner of module train (near sample S04).

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, PG, RT

TIME SAMPLED: 16:05 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Sands and gravels interfaced with silts and clays and tundra root material. Abundant organics, moist, near saturation.

SAMPLING METHOD: Dedicated scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS04-2S07
RADAR STATION: Wainwright WEATHER: Cloudy, misty, windy
SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 85 MAGNETIC HEADING:
FIXED POINT: Southeast corner of module train.
SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: PG, ML
TIME SAMPLED: 15:40 DEPTH OF SAMPLE (feet):
SAMPLE DESCRIPTION/COMMENTS: Directly south of S04. Sample to be taken at saturation level - need to auger. Silt, sand and gravel and minor mix of organic material taken near saturation at the end of the gravel pad.
SAMPLING METHOD: Auger, dedicated scoop
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS04-2S08-1

RADAR STATION: Wainwright WEATHER: Cloudy, misty, windy

SITE/AOC: Disel Fuel Spill, SS04 FEET FROM FIXED POINT: 75 MAGNETIC HEADING: NE

FIXED POINT: East along the module train from S01.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, ML

TIME SAMPLED: 15:35 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Gravel, soft sand, and fill material. It is saturated and has a strong petroleum odor.

SAMPLING METHOD: Dedicated scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SD01-1

RADAR STATION: Wainwright WEATHER: Clear with a mild breeze

SITE/AOC: Diesel Fuel Spills, SS04 FEET FROM FIXED POINT: 129 MAGNETIC HEADING: W in line with module train

FIXED POINT: West end of culvert draining southwest corner module train.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, RT

TIME SAMPLED: 14:50 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Silts and clays and tundra material, organics present, at saturation, no POL odor.

SAMPLING METHOD: Dedicated scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SD02-1

RADAR STATION: Wainwright WEATHER: Cloudy with mild wind, 38°F

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 300 HEADING: W

FIXED POINT: Discharge end of culvert that drains southwest corner of module train.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, RT, ML

TIME SAMPLED: 16:30 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: The sample is collected from the material under the tundra, heavy tundra material, silty clay at saturation. In line with second water tank from south.

SAMPLING METHOD: Shoveled the tundra and scooped into jar.

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SD03

RADAR STATION: Wainwright WEATHER: Cloudy and cold

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: West 270°

FIXED POINT: Discharge end of culvert draining northwest corner of module train.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, PG, ML

TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet): 0-6"

SAMPLE DESCRIPTION/COMMENTS: Plastic liner present at 6". Sample collection past extent of liner. Gravels with sand, sheens and black liquid present with no odor.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:00	8.4	640	4°C	Fresh Water	Low

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:10	BZ=0	0	NR		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SD04-1

RADAR STATION: Wainwright WEATHER: Cloudy, windy, and cold

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 82 MAGNETIC HEADING: 305°

FIXED POINT: Northwest end of northern most water tank.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, RT, ML

TIME SAMPLED: 16:15 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Sample collected at depth of 1 foot under the tundra. Brown silt, clay, and tundra material at saturation, abundant organics.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SW01

RADAR STATION: Wainwright WEATHER: Partly cloudy, breezy, cold, high 30's°F

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 129 MAGNETIC HEADING: W in line with module train

FIXED POINT: West end of culvert draining southwest corner of module train.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, PG

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Low turbidity, water showing strong POL (potentially) sheen.

SAMPLING METHOD: Dedicated scoop, dipped bottle

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID WAI-SS04-SW04

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
14:30	8.1	570	4°C		<1.0

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS	✓	250 ml	---
				TSS	✓	250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SW02

RADAR STATION: Wainwright WEATHER: Cloudy with a mild wind

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 300 HEADING: W

FIXED POINT: West end of bbl culvert draining southwest corner of module train.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, PG, ML

TIME SAMPLED: 16:25 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Water low turbidity with naturally occurring organic sheen. In line with second H_2O tank from south to north.

SAMPLING METHOD: Scoop for VOAs, dip for others

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:25	8.4	560	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SW03

RADAR STATION: Wainwright WEATHER: Clear with mild breeze

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 6 MAGNETIC HEADING: W

FIXED POINT: Discharge end of culvert that drains northwest corner of module train.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, PG, ML

TIME SAMPLED: 15:55 DEPTH OF SAMPLE (feet): Surface water

SAMPLE DESCRIPTION/COMMENTS: Sheen present on water. Large, orange-red organic material. Sample collected approximately 6 feet west of culvert.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:00	8.4	640	4°C	Fresh Water	Low

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:10	BZ=0	0	NR		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS04-SW04

RADAR STATION: Wainwright WEATHER: Partly cloudy, breezy, cold, ~40°F

SITE/AOC: Diesel Fuel Spill, SS04 FEET FROM FIXED POINT: 129 MAGNETIC HEADING: W

FIXED POINT: West end of culvert draining southwest corner module train.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, RT

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Low turbidity water showing strong POL (potentially) sheen in line with module train.

SAMPLING METHOD: Dedicated scoop, dipped bottle

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID WAI-SS04-SW01

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
14:30	8.1	570	4°C		<1.0

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS	✓	250 ml	---
				TSS	✓	250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE LANDFILL (LF05)

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-S01-1.0

RADAR STATION: Wainwright WEATHER: Foggy, cool, 45°F

SITE/AOC: Landfill, LF05 FEET FROM FIXED POINT: 50 MAGNETIC HEADING: 120°

FIXED POINT: Located approximately 50 feet from northeast corner of pad, adjacent upstream drainage stream

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet): 0.5-1.0

SAMPLE DESCRIPTION/COMMENTS: Upstream of landfill characterizing incoming potential influence(s). Tundra material; dark brown silty clay loam, heavy organics, roots near saturation.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-S02-1.0

RADAR STATION: Wainwright WEATHER: Foggy, cool, 45°F

SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 3 HEADING: S

FIXED POINT: 3 feet from edge of south wall, 20 feet from southeast corner of pad.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet): 1.0

SAMPLE DESCRIPTION/COMMENTS: Dark brown silty clay loam, heavy organics, near saturation, from just below tundra material.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED									
ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\LF05-S02

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-S03-1.0

RADAR STATION: Wainwright WEATHER: Foggy, cool, 45°F

SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 5 MAGNETIC HEADING: 225°

FIXED POINT: 5 feet off southwest toe of landfill pad.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 14:45 DEPTH OF SAMPLE (feet): 1.0

SAMPLE DESCRIPTION/COMMENTS: Dark brown silty clay loam, near saturation.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-LF05-S07-1.0

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-S04-1.5
RADAR STATION: Wainwright WEATHER: Foggy, cool, 45°F
SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: Center MAGNETIC HEADING:
FIXED POINT: Direct center of landfill pad.
SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: PG, JM
TIME SAMPLED: 15:00 DEPTH OF SAMPLE (feet): 1.5
SAMPLE DESCRIPTION/COMMENTS: Sand and gravel fill, slight dark layer where sample was taken.

SAMPLING METHOD: Scoop
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-S07-1.0
RADAR STATION: Wainwright WEATHER: Foggy, cool, 45°F
SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 5 MAGNETIC HEADING: 225°
FIXED POINT:
SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: PG, JM
TIME SAMPLED: 14:45 DEPTH OF SAMPLE (feet):
SAMPLE DESCRIPTION/COMMENTS: Dark brown silty clay loam, near saturation.

SAMPLING METHOD: Scoop
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-LF05-S03-1.0

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-SD01

RADAR STATION: Wainwright WEATHER: Foggy, cool, breezy, 45°F

SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 30 MAGNETIC HEADING: 315°

FIXED POINT: 30 feet southwest and downstream from south toe of landfill.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM, DP

TIME SAMPLED: 15:25 DEPTH OF SAMPLE (feet): 0-0.5

SAMPLE DESCRIPTION/COMMENTS: Dark brown silty clay loam. Abundant organics, moist to saturated, heavy petroleum staining and organic odor.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-SD02

RADAR STATION: Wainwright WEATHER: Foggy, cool, breezy

SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 65 MAGNETIC HEADING: ______

FIXED POINT: 65 feet southwest of southeast toe of landfill at confluence of main drain and waste stream.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet): ______

SAMPLE DESCRIPTION/COMMENTS: Dark brown silty clay loam.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID ______

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID ______

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\LF05SD02

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-SW01

RADAR STATION: Wainwright WEATHER: Breezy, cold, 45°F

SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 30 MAGNETIC HEADING: 225°

FIXED POINT: 30 feet southwest of southeast toe of landfill pad.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 15:25 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Dark amber to brown, high organic odor, POL sheen on surface. Collected with SD01

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:15	6.3	670	6°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
15:30	BZ=0	0	NR		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED									
		BARROW LAB					ANCHORAGE LAB		
ANALYSES	✓	CONTAINERS			ANALYSES	✓	CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS	✓	1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-LF05-SW02
RADAR STATION: Wainwright WEATHER: Breezy, overcast, cool, 40°F
SITE/AOC: Landfill LF05 FEET FROM FIXED POINT: 65 MAGNETIC HEADING: 225
FIXED POINT: 65 feet southwest of southeast toe of landfill at confluence of main drain and waste stream.
SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: JM, DP
TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet):
SAMPLE DESCRIPTION/COMMENTS: Light brown to amber, slight sheen on surface.

SAMPLING METHOD: Scoop
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:25	7.1	620	6°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS	✓	1 liter	---
VOC-BTEX 8020	✓			TDS	✓	250 ml	---
				TSS	✓	250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOGS FOR THE GARAGE (SS07)

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-S01

RADAR STATION: Wainwright WEATHER: Overcast, cold, 30°F

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: ______

FIXED POINT: Beneath southeast drain of garage under building

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, JM

TIME SAMPLED: 11:45 DEPTH OF SAMPLE (feet): 0 - 0.5

SAMPLE DESCRIPTION/COMMENTS: Sand and gravel fill, no odor, heavy surface staining

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ■ QA/QC Extra Volumes (replicate)

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID ______

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-SS07-S03

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-S02

RADAR STATION: Wainwright WEATHER: Overcast, cold, breezy

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 0 MAGNETIC HEADING:

FIXED POINT: Beneath north east drain of garage

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, JM, RT

TIME SAMPLED: 12:00 DEPTH OF SAMPLE (feet): 0 - 0.5

SAMPLE DESCRIPTION/COMMENTS: Sand and gravel fill, heavy staining

SAMPLING METHOD: scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES	✓			TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-S03

RADAR STATION: Wainwright WEATHER: Overcast, cold, 30°F

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 0' MAGNETIC HEADING:

FIXED POINT: Beneath southeast drain of garage, under building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, JM

TIME SAMPLED: 11:45 DEPTH OF SAMPLE (feet): 0 - 0.5

SAMPLE DESCRIPTION/COMMENTS: Sand and gravel fill, no odor, heavy surface staining

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-SS07-S01

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SD01

RADAR STATION: Wainwright WEATHER: Overcast, cold, breezy

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 1 foot MAGNETIC HEADING: 270° (not magnetic)

FIXED POINT: Discharge end of bbl culvert extending westerly from northwest corner of garage.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, JM, ML

TIME SAMPLED: 12:15 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Sample dug from below board that blocks opening. Brown sandy soils with a petroleum odor present.

SAMPLING METHOD: spade and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SD02

RADAR STATION: Wainwright WEATHER: Overcast, cold, breezy

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 8 MAGNETIC HEADING: 90°

FIXED POINT: 8 feet east of discharge pipe

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, JM, ML

TIME SAMPLED: 11:55 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Organic material, mainly silt, heavy petroleum staining and sheen on surface water. East end of culvert near new gravel berm.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SD03

RADAR STATION: Wainwright WEATHER: ~30°F, Overcast, cold, breezy

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 200 MAGNETIC HEADING: NE

FIXED POINT: At outlet of culvert leading to second pond from SS07, approximately 200 feet NE of Garage.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JM, ML, RT

TIME SAMPLED: 11:55 DEPTH OF SAMPLE (feet): 0 - 0.5"

SAMPLE DESCRIPTION/COMMENTS: Abundant organic material. No sheen or odor present.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	NO ANALYSES ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SD04

RADAR STATION: Wainwright WEATHER: Overcast, cold, breeze, 30°F

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 90 MAGNETIC HEADING: 330°

FIXED POINT: Culvert NW of northeast corner of Garage.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, JM, ML

TIME SAMPLED: 12:05 DEPTH OF SAMPLE (feet): 0 - 0.5

SAMPLE DESCRIPTION/COMMENTS: Abundant organic material. Silts with minor amounts of sand. No odor or sheen. Sample collected at north end of culvert.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	3 x 40 ml	8 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS07-2SD05

RADAR STATION: Wainwright WEATHER: Cloudy with strong wind

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 300 MAGNETIC HEADING: NW

FIXED POINT: NW corner of the garage building.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 16:20 DEPTH OF SAMPLE (feet): 0 - 0.5

SAMPLE DESCRIPTION/COMMENTS: Tundra material with mixed silt and clay, saturated. The sample from the location of 2SW04 was not collected due to high petroleum odor. There is a detectable odor at this location.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH		1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
EPH	✓			TOC		500 ml	4 oz
VPH	✓			TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS07-2SD06

RADAR STATION: Wainwright WEATHER: Cloudy and windy

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 250 HEADING: W

FIXED POINT: Mid point of the west side of garage building.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 16:35 DEPTH OF SAMPLE (feet): 1 Foot

SAMPLE DESCRIPTION/COMMENTS: Tundra mat growing through sand and gravel mix material, saturated, organic rich.

SAMPLING METHOD: Scooped into jar

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH		1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
EPH	✓			TSS		250 ml	---
VPH	✓			TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SW01

RADAR STATION: Wainwright WEATHER: 30°F cold and windy

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 20 feet MAGNETIC HEADING: ______

FIXED POINT: NW end of culvert that extends north westerly from NW corner of garage.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, JM, ML

TIME SAMPLED: 12:25 DEPTH OF SAMPLE (feet): ______

SAMPLE DESCRIPTION/COMMENTS: Clear, no visible sheen or odor present. Sample collected ~20 ft along the direction of the culvert.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID ______

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID ______

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
12:30	8.6	670	5°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010		3 x 40 ml	8 oz	DISS METALS	✓	1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SW02

RADAR STATION: Wainwright WEATHER: Overcast, windy, cold, 30°F

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: ~20 MAGNETIC HEADING: East

FIXED POINT: East end of utility culvert extending east from garage's east end.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, JM, ML

TIME SAMPLED: 11:50 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Sample from pond east of culvert (utility) discharge, clear water

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
12:00	7.5	630	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB		No Analyses		ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES	✓			TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS07-SW03

RADAR STATION: Wainwright WEATHER: Breezy, cold, 30°F, overcast

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 200 MAGNETIC HEADING: NE

FIXED POINT: At outlet of culvert leading to second pond east of SS07, ~200 feet NE of garage.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, JM, RT

TIME SAMPLED: 12:15 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Clear with abundant organic matter

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
12:20	8.2	800	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010		3 x 40 ml	8 oz	DISS METALS	✓	1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS07-2SW04

RADAR STATION: Wainwright WEATHER: Cloudy and cold

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 250 MAGNETIC HEADING: NW

FIXED POINT: The northwest corner of the garage building

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet): Surface water

SAMPLE DESCRIPTION/COMMENTS: There is a visible sheen on the water. There was a strong petroleum, odor therefore the sediment sample was moved to another location.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID WAI-SS07-2SW06

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS07-2SW05

RADAR STATION: Wainwright WEATHER: Cloudy with strong winds

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 250 MAGNETIC HEADING: W

FIXED POINT: The mid point of the west side of garage building.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 16:30 DEPTH OF SAMPLE (feet): Surface water

SAMPLE DESCRIPTION/COMMENTS: Foamy.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\SS072SW5

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS07-2SW06

RADAR STATION: Wainwright WEATHER: Cloudy with strong winds

SITE/AOC: Garage SS07 FEET FROM FIXED POINT: 250 MAGNETIC HEADING: NW

FIXED POINT: The NW corner of the garage building

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 1600 DEPTH OF SAMPLE (feet): Surface water

SAMPLE DESCRIPTION/COMMENTS: A visible sheen on the water surface, when the sediment sampled was shoveled, there was a strong petroleum, odor therefore the sediment sample was moved to another location.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID WAI-SS07-2SW04

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE AIRSTRIP DIESEL (SS08)

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SD01
RADAR STATION: Wainwright WEATHER: Cloudy, strong wind
SITE/AOC: Airstrip Fuel Spill, SS08 FEET FROM FIXED POINT: 100 MAGNETIC HEADING: 0'
FIXED POINT: Southwest corner of intersection of runway and fresh lake road, 100 feet north.
SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: RT, ML
TIME SAMPLED: 16:20 DEPTH OF SAMPLE (feet): 6"
SAMPLE DESCRIPTION/COMMENTS: Sandy, organic, small amount of gravel with organic odor - natural.

SAMPLING METHOD:
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
	.				
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SD02

RADAR STATION: Wainwright WEATHER: Cloudy, strong wind

SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 25 MAGNETIC HEADING: 330°

FIXED POINT: The southwest corner of the intersection of runway and fresh water lake.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 15:55 DEPTH OF SAMPLE (feet): Surface to 6"

SAMPLE DESCRIPTION/COMMENTS: A lot of organic matter, with some gravel and sand. Sample collected at interface of gravel pad and surface water.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SD03
RADAR STATION: Wainwright WEATHER: Cloudy, strong wind
SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 100 MAGNETIC HEADING: 225°
FIXED POINT: Southwest corner of runway and fresh lake road.
SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)
SAMPLERS: RT, ML
TIME SAMPLED: 15:45 DEPTH OF SAMPLE (feet): 6"
SAMPLE DESCRIPTION/COMMENTS: Sand and gravel. Sample collected adjacent to the turn in the runway light support gravel pad. Sample collected adjacent to gravel from surface water.
SAMPLING METHOD: Scoop
QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SD04

RADAR STATION: Wainwright WEATHER: Cloudy, strong wind

SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: 0

FIXED POINT: Southeast corner of runway and fresh lake road.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 15:40 DEPTH OF SAMPLE (feet): Surface to 6"

SAMPLE DESCRIPTION/COMMENTS: Mostly peat and sediment. Sample collected adjacent to the gravel of the freshwater lake road and runway.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-SS08-SD05

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SD05

RADAR STATION: Wainwright WEATHER: Cloudy, strong wind

SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: 0

FIXED POINT: Southeast corner of runway and fresh lake road.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 15:40 DEPTH OF SAMPLE (feet): Surface to 6"

SAMPLE DESCRIPTION/COMMENTS: Mostly peat and sediment. Sample collected adjacent to the gravel of the freshwater lake road and runway.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID WAI-SS08-SD04

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\SS02SD05

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SW01

RADAR STATION: Wainwright WEATHER: Cloudy with strong wind

SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 100 MAGNETIC HEADING: 0

FIXED POINT: Southwest corner of intersection of runway and fresh lake road.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 16:15 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Water has an oily sheen, seems natural, no odor.

SAMPLING METHOD: Scoop for VOAs and dip for others

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:00	7.4	630	5°C		

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\SS02SW01

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SW02

RADAR STATION: Wainwright WEATHER: Cloudy, strong winds, 30°F

SITE/AOC: Garage SS08 FEET FROM FIXED POINT: 100 MAGNETIC HEADING: 225°

FIXED POINT: Southwest corner of intersection of runway and fresh lake road

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 15:35 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Water is clear with a brownish tint. Sample collected at the turn in the runway light support gravel pad. Sample collected adjacent to gravel from surface water.

SAMPLING METHOD: Scoop for VOAs and dip for others

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
15:30	6.9	140	8°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED										
ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\SS02SW02

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SW03

RADAR STATION: Wainwright WEATHER: Cloudy, strong wind

SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: 0

FIXED POINT: Southeast corner of intersection of runway and fresh lake road.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 16:30 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Water is clean with a brownish tint. Sample collected adjacent to the gravel of the freshwater lake road and runway.

SAMPLING METHOD: Scoop for VOAs and dip for others

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID WAI-SS08-SW04

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:30	7.5	760	6°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\SS02SW03

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-SS08-SW04

RADAR STATION: Wainwright WEATHER: Cloudy, strong wind

SITE/AOC: Airstrip Fuel Spill SS08 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: 0°

FIXED POINT: Southeast corner of intersection of runway and fresh lake road.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 15:30 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Water is clean with a brownish tint. Sample collected adjacent to the gravel pad of the Freshwater lake road and the runway.

SAMPLING METHOD: Scoop for VOAs and dip for others

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID WAI-SS08-SW03

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:30	7.5	760	6°C		

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE VEHICLE STORAGE AREA (SS09)

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-S01-2.5

RADAR STATION: Wainwright WEATHER: Breezy, cold, 30°F

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 34 HEADING: NW

FIXED POINT: 34 feet from northwest corner of Radar Support Building in straight line toward west end of module train.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, JM

TIME SAMPLED: 15:15 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Gray brown silty clay and peat. Moist. Located on pad in between support building (northwest corner) and radar tower. No odor.

SAMPLING METHOD: Hand auger and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-S02-2.5

RADAR STATION: Wainwright WEATHER: Breezy, cold, snowy, 30°F

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 57 HEADING: South

FIXED POINT: 57 feet from northwest corner, 31 feet from southwest corner of support building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, JM

TIME SAMPLED: 15:30 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Wet gravel at 1.8 feet. Light brown to dark brown silty clay and silty peat. Wet. No odor. Sample collected halfway between radar support building and edge of gravel pad.

SAMPLING METHOD: Hand auger and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ■ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-S03-4.0

RADAR STATION: Wainwright WEATHER: Strong breeze, cold, snow winds

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 33 HEADING: NW

FIXED POINT: 33' from SW corner of Support Building, 19.5' from NW corner of adjacent new building, SW of Support Building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, JM

TIME SAMPLED: 15:56 DEPTH OF SAMPLE (feet): 4

SAMPLE DESCRIPTION/COMMENTS: Frozen, near frozen brown (reddish) clayey silt, some peaty material, no odor (of contaminants).

SAMPLING METHOD: Hand auger and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-S04-0.75

RADAR STATION: Wainwright WEATHER: Overcast, cold, 30°F

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 75 HEADING: West

FIXED POINT: Southwest corner of radar support building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, JM

TIME SAMPLED: 17:10 DEPTH OF SAMPLE (feet): 0.25-0.75

SAMPLE DESCRIPTION/COMMENTS: Peat and gravelly sand. Sample collected west/southwest in line with southern end of radar support building. Sample location at the interface of tundra and gravel pad.

SAMPLING METHOD: Spade and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED									
ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-S05-0.75

RADAR STATION: Wainwright WEATHER: Overcast, cold, 30°F

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 75 HEADING: West

FIXED POINT: Midpoint of radar support building

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, JM

TIME SAMPLED: 17:00 DEPTH OF SAMPLE (feet): 0.25-0.75

SAMPLE DESCRIPTION/COMMENTS: Peat and organics. Sample collected ~75 feet west of the midpoint of the radar support building at the tundra, gravel pad interface.

SAMPLING METHOD: Spade and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-S06

RADAR STATION: Wainwright WEATHER: Sunny, cold, snowy

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 100 HEADING: NNW

FIXED POINT: NW corner of radar support building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB

TIME SAMPLED: 17:17 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Sand and gravel. Construction activities nearby. Visible sheen on seeds and water in sampling area. Sampling collected from tundra and gravel pad interface.

SAMPLING METHOD: Spade and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS09-2S07-1.5

RADAR STATION: Wainwright WEATHER: Frigid, misty, blowing hard

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 65 HEADING: East

FIXED POINT: 15 feet east of main road, 65 feet east and perpendicular to fixed tanks.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DP, JM

TIME SAMPLED: 14:15 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Collected at interface of tundra material and sandy gravel. Saturated. Angular to subangular soils.

SAMPLING METHOD: Spade and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED									
		BARROW LAB					ANCHORAGE LAB		
ANALYSES	✓	CONTAINERS			ANALYSES	✓	CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-STKP-S01
RADAR STATION: Wainwright WEATHER: Frigid, misty, blowing hard
SITE/AOC: STKP / stockpile soil FEET FROM FIXED POINT: 0 MAGNETIC HEADING: East
FIXED POINT: Stockpiled Soils

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DP, JM
TIME SAMPLED: 14:45 DEPTH OF SAMPLE (feet): 0 - 0.5"
SAMPLE DESCRIPTION/COMMENTS: From stockpiled soil, grayish-brown silt. Sample collected from east side of stockpiled soil area.
SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes
☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID
☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED									
ANALYSES	✓	BARROW LAB CONTAINERS WATER		SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C
Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)
Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-STKP-S02

RADAR STATION: Wainwright WEATHER: Frigid, misty, blowing hard

SITE/AOC: STKP / stockpile soil FEET FROM FIXED POINT: 0 HEADING: West

FIXED POINT: Stockpiled Soils

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS:

TIME SAMPLED: 14:48 DEPTH OF SAMPLE (feet): 0 - 0.5

SAMPLE DESCRIPTION/COMMENTS: Stockpiled soil sample. Sample collected from west side of the stockpiled soil area.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH		1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-SD01

RADAR STATION: Wainwright WEATHER: Snowy, cold, windy

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 75 HEADING: West

FIXED POINT: 76 feet due west of gravel pad, in line with direct center of radar support building.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JM, PG

TIME SAMPLED: 17:45 DEPTH OF SAMPLE (feet): 0-0.5

SAMPLE DESCRIPTION/COMMENTS: Medium brown silty clay with abundant organics. Plume chasing sample taken from edge of area of visually detected sheen.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS09-2SD02

RADAR STATION: Wainwright WEATHER: Frigid, misty, blowing hard

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 15 HEADING: West

FIXED POINT: 15 feet west of main road, 25 feet north of fixed tanks pad.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DP, JM

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet): 0-0.5

SAMPLE DESCRIPTION/COMMENTS: Tundra material and sandy gravel. Collected with 2SW01. No evidence of contamination.

SAMPLING METHOD: Spade and scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-SS09-SW01

RADAR STATION: Wainwright WEATHER: Sunny, snowy

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 35 MAGNETIC HEADING: SSE

FIXED POINT: 35 feet south, Southeast of southeast corner of berm.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 17:15 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Light amber color, sheen on water. Sample collected from surface water southeast of new building.

SAMPLING METHOD:

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
17:20	7.9	620	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED								
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓			SVOC (8270)	✓	1 liter		8 oz
PESTICIDES				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS	✓	1 liter		---
VOC-BTEX 8020	✓			TDS	✓	250 ml		---
				TSS	✓	250 ml		---
				TOC	✓	500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-SS09-2SW02

RADAR STATION: Wainwright WEATHER: Frigid, misty, blowing hard

SITE/AOC: Vehicle Storage Area SS09 FEET FROM FIXED POINT: 15 HEADING: West

FIXED POINT: 15 feet west of main road, 75 feet north of fixed tank pad.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 13:45 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Clear, no suspected sediments, small amount of organic sheen visible in ponded water, collected with 2SW02.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
13:50	7.5	700	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS	✓	1 liter	---
VOC-BTEX 8020	✓			TDS	✓	250 ml	---
				TSS	✓	250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

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SAMPLE COLLECTION LOGS FOR BACKGROUND (BKGD)

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-BKGD-S01

RADAR STATION: Wainwright WEATHER: Cloudy and windy

SITE/AOC: BKGD FEET FROM FIXED POINT: ______ MAGNETIC HEADING: ______

FIXED POINT: East of the confluence of fresh water lake road with fresh water.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet): 6"

SAMPLE DESCRIPTION/COMMENTS: Mostly sand with slight amount of organic matter.

SAMPLING METHOD: ______

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID ______

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID ______

WATER PARAMETERS

TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS

TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
	-				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER	BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER	ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-BKGD-2S02-1

RADAR STATION: Wainwright WEATHER: Windy, frigid, partly cloudy, 10-20°F

SITE/AOC: BKGD FEET FROM FIXED POINT: 1,400 MAGNETIC HEADING: East

FIXED POINT: Heated warehouse.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, ML, RT

TIME SAMPLED: 14:50 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Sample has abundant organic matter. Collected from interface layer of peat/sod and silts/clays.

SAMPLING METHOD: Deconned shovel and disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	—
VOC-BTEX 8020	✓			TDS		250 ml	—
				TSS		250 ml	—
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-BKGD-SD01

RADAR STATION: Wainwright WEATHER: Cloudy, cold, windy

SITE/AOC: BKGD FEET FROM FIXED POINT: ______ MAGNETIC HEADING: ______

FIXED POINT: Fresh water lake east of fresh water lake road.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 14:25 DEPTH OF SAMPLE (feet): Surface to 6"

SAMPLE DESCRIPTION/COMMENTS: Sand, sediments, and gravel with slight organic matter.

SAMPLING METHOD: Scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID ______

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID ______

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED								
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	✓	4 oz
PCB	✓			SVOC (8270)	✓	1 liter		8 oz
PESICIDES	✓			TOTAL METALS	✓	1 liter	✓	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	✓	—
VOC-BTEX 8020	✓			TDS		250 ml		—
				TSS		250 ml		—
				TOC	✓	500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-BKGD-2SD02-1

RADAR STATION: Wainwright WEATHER: Windy, frigid, partly cloudy, 10-20°F

SITE/AOC: BKGD FEET FROM FIXED POINT: 1,400 MAGNETIC HEADING: East

FIXED POINT: Heated storage warehouse.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML, PG

TIME SAMPLED: 14:55 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Sample collected at silts-clay interface and tundra material saturated zone. Presence of high organic matter.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
14:50	7.4	580	4°C	NR	Fresh Water

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-BKGD-SW01

RADAR STATION: Wainwright WEATHER: Cloudy, cold, choppy water

SITE/AOC: BKGD FEET FROM FIXED POINT: ______ MAGNETIC HEADING: ______

FIXED POINT: Fresh water lake east of fresh water lake road.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RT, ML

TIME SAMPLED: 14:10 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: The water was choppy, full of plant materials. The lake is the drinking water source used by the Station.

SAMPLING METHOD: Scoop for VOAs, bottle dip for others

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID ______

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID ______

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
14:00	6.9	130	5°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED									
ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml	✓	4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESICIDES	✓				TOTAL METALS	✓	1 liter	✓	8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS	✓	1 liter	✓	—
VOC-BTEX 8020	✓				TDS	✓	250 ml		—
					TSS	✓	250 ml		—
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-BKGD-2SW02

RADAR STATION: Wainwright WEATHER: Windy, frigid, partly cloudy, 10-20°F

SITE/AOC: BKGD FEET FROM FIXED POINT: 1,400 MAGNETIC HEADING: East

FIXED POINT: Heated storage warehouse.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, ML, RT

TIME SAMPLED: 14:45 DEPTH OF SAMPLE (feet): Surface water

SAMPLE DESCRIPTION/COMMENTS: Water has a brownish tint, but is clear with organisms present.

SAMPLING METHOD: Disposable scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
14:50	7.4	580	4°C	NR	

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS	✓	1 liter	—
VOC-BTEX 8020	✓			TDS	✓	250 ml	—
				TSS	✓	250 ml	—
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR QA/QC

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-AB01

RADAR STATION: Wainwright WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM, ML

TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

■ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED											
		BARROW LAB						ANCHORAGE LAB			
ANALYSES	✓	CONTAINERS				ANALYSES	✓	CONTAINERS			
		WATER		SOIL				WATER		SOIL	
TPH		1 liter		8 oz		VOC (8260)		3 x 40 ml		4 oz	
PCB						SVOC (8270)		1 liter		8 oz	
PESTICIDES						TOTAL METALS		1 liter		8 oz	
HVOC 8010	✓	1 x 40 ml		4 oz		DISS METALS		1 liter		---	
VOC-BTEX 8020	✓					TDS		250 ml		---	
						TSS		250 ml		---	
						TOC		500 ml		4 oz	
						TCLP		2 liters		2 x 8 oz	

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-EB01

RADAR STATION: Wainwright WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DP, ML, RT

TIME SAMPLED: 17:30 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ■ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)					

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	—
VOC-BTEX 8020	✓			TDS		250 ml	—
				TSS		250 ml	—
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-EB02

RADAR STATION: Wainwright WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JB, ML, PG, JM

TIME SAMPLED: 17:45 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ■ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-2EB03

RADAR STATION: Wain WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: PG, JM

TIME SAMPLED: 17:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ■ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/29/93 SAMPLE ID: WAI-TB01

RADAR STATION: Wainwright WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JM, ML, RT

TIME SAMPLED: 12:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

■ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH		1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

ALASKA\4109641303\TB-01

SAMPLE COLLECTION LOG

DATE: 08/30/93 SAMPLE ID: WAI-TB02

RADAR STATION: Wainwright WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ML, PG, JM

TIME SAMPLED: 12:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

■ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED								
ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH		1 liter	8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB				SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter		—
VOC-BTEX 8020	✓			TDS		250 ml		—
				TSS		250 ml		—
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/07/93 SAMPLE ID: WAI-2TB03

RADAR STATION: Wainwright WEATHER:

SITE/AOC: FEET FROM FIXED POINT: MAGNETIC HEADING:

FIXED POINT:

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DP, PG, JM

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS:

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

■ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED							
		BARROW LAB				ANCHORAGE LAB	
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH		1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	—
VOC-BTEX 8020	✓			TDS		250 ml	—
				TSS		250 ml	—
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet) (i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

APPENDIX E

CHAIN-OF-CUSTODY FORMS

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0438

PROJ. NO.	PROJECT NAME	YR MO NO.
WAINWRIGHT	DEW LINE	

SAMPLERS: (Signature) Peter J. McGran [illegible]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA	SEMI	T METAL	D METAL	TOC	TSS	TPH	REMARKS
SS04	9/7	1530		X	WAI SS04 2S08	1							X	
SS07	9/7	1635		X	WAI SS07 2SD06	1							X	
EB	9/7	1100		X	WAI EB 03	7	X	X	X	X				
STKP	9/7	1445		X	WAI STKP S01	3	X	X	X	X				
STKP	9/7	1448		X	WAI STKP S02	3	X	X	X	X				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Peter J. McGran	9/7/93 1755	[signature]	[signature]		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:
		[signature]	9/9/93 1315	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY (HI) RECORD

NO. 0439

PROJ. NO.	PROJECT NAME	YR MO NO.
WAINWRIGHT	DEW LINE	

SAMPLERS: (Signature) [signatures]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	VOA	SEMI	T METAL	D METAL	TOC	TSS	TDS	REMARKS
~~BKGD~~	~~9/7~~	~~1445~~		~~X~~	~~WAI BKGD 2SW02~~	~~9~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~NOT PRESERVED~~ DP
BKGD	9/7	1455		X	WAI BKGD 2SD02/	3	X	X	X		X			
BKGD	9/7	1450		X	WAI BKGD 2S02/	3	X	X	X		X			
~~SS04~~	~~9/7~~	~~1530~~		~~X~~	~~WAI SS04 2S08~~	~~1~~					~~X~~			~~TPH ONLY~~ DP
SS09	9/7	1345		X	WAI SS09 2SW02/	9	X	X	X	X	X	X	X	
BKGD	9/7	1445		X	WAI BKGD 2SW02/	9	X	X	X	X	X	X	X	NOT PRESERVED
TB	9/7	1430		X	WAI TB 03 /	2	X							

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	9/7/93 1750	[signature]	[signature]		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	
		[signature]	9/9/93 1315		

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0447

PROJ. NO.	PROJECT NAME	YR	MO	NO.
WAINWRIGHT	DEW LINE			

SAMPLERS: (Signature)

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	BTEX	BTEX + HVOC	PCB	PEST	TPH			REMARKS
BKGD	9/7	1445		X	WAI-BKGD-2SW021	4	X	X	X	X				NOT PRESERVED
BKGD	9/7	1455		X	WAI-BKGD-2SD021	2	X	X	X	X				
BKGD	9/7	1450		X	WAI-BKGD-2S021	2	X	X	X	X				
SS04	9/7	1540		X	WAI-SS04-2S07	1				X				
SS04	9/7	1530		X	WAI-SS04-2S08	1				X				
SS09	9/7	1345		X	WAI-SS09-2SW02	5	X	X	X	X				
SS09	9/7	1400		X	WAI-SS09-2SD02	2	X			X				
TB	9/7	1430		X	WAI-TB-03	2	X							

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	9/7/93 1730			9/8/93 1545	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO.

YR	MO				
NO.					

PROJ. NO.: WAINWRIGHT

PROJECT NAME: DEW LINE

SAMPLERS: (Signature) Peter J. McGhan

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	DRO	BTEX + HDOC	PCB	PEST	TPH			REMARKS
SS07	9/7	1600		X	WAI SS07 2S004	1					X			
SS07	9/7	1630		X	WAI SS07 2S005	1					X			
SS07	9/7	1600		X	WAI SS07 2S006	1					X			
SS07	9/7	1620		X	WAI SS07 2SD05	1					X			
SS07	9/7	1635		X	WAI SS07 2SD06	1					X			
EB	9/7	1700		X	WAI EB 03	5		X	X	X	X			NOT PRESERVED
SS09	9/7	1415		X	WAI SS09 2S07	2		X			X			
STKP	9/7	1445		X	WAI-STKP-S01	2		X			X			
STKP	9/7	1448		X	WAI-STKP-S02	2		X			X			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Peter J. McGhan	9/7/93 1800	[signature]	[signature]	9/8/93 1545	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

IGF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

BAKKOW (2)

NO. 0462

PROJ. NO.	PROJECT NAME	YR MO NO.
WAINWRGAT	DEW LINE	

SAMPLERS: (Signature) Lorrey Mandl, Mengistu Lemma, Robert Taylor

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	BTEX	BTEX + TIVC	TPH	PCB	PEST			REMARKS
BYGD	8/29	1430		X	WAI S01 (BYGD) /	2		X	X	X	X			
BYGD	8/29	1420		X	WAI BYGD SD01 /	2		X	X	X	X			
SS08	8/29	1620		X	WAI SS08 SD01 /	2	X		X					
SS08	8/29	1555		X	WAI SS08 SD02 /	2	X		X					
SS08	8/29	1545		X	WAI SS08 SD03 /	2	X		X					
SS08	8/29	1640		X	WAI SS08 SD04 /	2	X		X					
SS08	8/29	1640		X	WAI SS08 SD05 /	2	X		X					
LF05	8/29	1525		X	WAI LF05 SW02 /	5		X	X	X				
LF05	8/29	1525		X	WAI LF05 SW01 /	5		X	X	X				
TB	8/29	1200		X	WAI TB 01 /	2		X						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lorrey Mandl, Robert Taylor, Mengistu Lemma	8/29/93 1730	[signature]	[signature]	8/29/93 1930	SPEED AIRE
[signature]	8/29/93 2145				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:
		[signature]	8-31 1710	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

BAILKOW (1)

NO. 0463

PROJ. NO.	PROJECT NAME	YR MO NO.
WAINWRIGHT	DON LINE	

SAMPLERS: (Signature) [signatures] Jerry Mansell

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	DRO	BTEX + HVOC	TPH	PCB	PEST	REMARKS
ST02	8/29	1420		X	WAI-ST02-S01 /	2	X	X	X			
ST02	8/29	1400		X	WAI-ST02-S02 /	2	X	X	X			
ST02	8/29	1430		X	WAI-ST02-S03 /	2	X	X	X			
ST02	8/29	1450		X	WAI-ST02-S04 /	2	X	X	X			
ST02	8/29	1505		X	WAI-ST02-S05 /	2	X	X	X			
ST02	8/29	1430		X	WAI-ST02-S06 /	2	X	X	X			
LF05	8/29	1400		X	WAI-LF05-S01-1 /	2	X	X	X			
LF05	8/29	1430		X	WAI-LF05-S02-1	2	X	X	X			
LF05	8/29	1445		X	WAI-LF05-S03-1	2	X	X	X			
LF05	8/29	1500		X	WAI-LF05-S04-1.5	2	X	X	X	X		
LF05	8/29	1445		X	WAI-LF05-S07-1 /	2	X	X	X			
LF05	8/29	1515		X	WAI-LF05-SD01 /	2	X	X	X			
LF05	8/29	1600		X	WAI-LF05-SD02 /	2	X	X	X			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Jerry Mansell [signature]	8/29/93 1700	[signature]	[signature]	8/29/93 2145	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
		S. J. Dock			
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	
		S. J. Dock	7/27/93 1700		

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

Anchorage (1)

NO. 0464

PROJ. NO.	PROJECT NAME	YRMO NO.
WAINWRIGHT	DEN LINE	

SAMPLERS: (Signature) [illegible]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA	SEMI	T METAL	D METAL	TOC	TDS	TSS	REMARKS
LF05	8/29	1600		X	WAI LF05 SD02 /	3	X	X	X		X			
LF05	8/29	1500		X	WAI LF05 S04-1.5 /	3	X	X	X		X			
ST02	8/29	1450		X	WAI ST02 S04 /	3	X	X	X					
ST02	8/29	1400		X	WAI ST02 S02 /	3	X	X	X					
BKGD	8/29	1420		X	WAI BKGD SD01 /	3	X	X	X		X			
BKGD	8/29	1430		X	WAI BKGD S01 /	3	X	X	X		X			
EB	8/29	1730		X	WAI EB 01 /	6	X	X	X		X			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	8/30/93 1930	[illegible]	[illegible]	[illegible]	[illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

ANCHORAGE (2)

NO. 0465

PROJ. NO. WAINWRIGHT — PROJECT NAME DEW LINE

NO. (YR MO)

SAMPLERS: (Signature) [signature]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA	SEMI	T METAL	D METAL	TOC	TSS	TDS	REMARKS
LF05	8/29	1525		X	WAI LF05 SW01	10	X	X	X	X	X	X	X	
LF05	8/29	1545		X	WAI LF05 SW02	10	X	X	X	X	X	X	X	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8/29/93 1930	[signature]	[signature]	2115 8/29/93	[signature]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

BAKKOWS

NO. 0466

PROJ. NO.	PROJECT NAME	YR MO NO.
WAINWRIGHT	DEW LINE	

SAMPLERS: (Signature) DPS Mfanyista Lemm

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	BTEX	BTEX + HDOC	TPH	PCB	PEST			REMARKS
SS08	8/29	1535		X	WAI SS08 SW002	5	X		X		X			
SS08	8/29	1615		X	WAI SS08 SW001	4	X		X					
SS08	8/29	1630		X	WAI SS08 SW003	4	X		X					
SS08	8/29	1630		X	WAI SS08 SW004	4	X		X					
EB	8/29	1730		X	WAI EB 01	5		X	X	X	X			
BKGD	8/29	1410		X	WAI BKGD SW001	5		X	X	X	X			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mfanyista Lemm	8/29/93 1930	DPS	[signature]	8/29/93 2145	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	
		S.J. Den	9/2/93 1710		

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

ANCHORAGE (3)

NO. 0467

PROJ. NO.	PROJECT NAME	NO. OF CON-TAINERS	VOA	SEMI	T METAL	D METAL	TOC	TDS	TSS	REMARKS
WAINWRIGHT	DEW LINE									

SAMPLERS: (Signature)

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	VOA	SEMI	T METAL	D METAL	TOC	TDS	TSS	REMARKS
SS08	8/29	1555		X	WAI SS08 SD02	2	X	X						
SS08	8/29	1535		X	WAI SS08 SW02	7	X	X			X	X	X	
BKGD	8/29	1410		X	WAI BKGD SW01	10	X	X	X	X	X	X	X	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	[illegible]			9/?/93 715	[illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0468

PROJ. NO.	PROJECT NAME	NO. YRMO
WAINWRIGHT	DEW LINE	

SAMPLERS: (Signature) [illegible]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS		BTEX	BTEX +HWC	TPH	[illegible]	[illegible]		REMARKS
SS07	8/30	1215		X	WAI SS07 SD01	2		X	X	X	X			
SS07	8/30	1155		X	WAI SS07 SD02	2		X	X	X	X			
SS07	8/30	1230		X	WAI SS07 SD03	2		X	X	X	~~X~~ DP			
SS07	8/30	1205		X	WAI SS07 SD04	2		X	X	X				
SS07	8/30	1145		X	WAI SS07 S01	2		X	X	X	X			
SS07	8/30	1200		X	WAI SS07 S02	2		X	X	X				
SS07	8/30	1145		X	WAI SS07 S03	2		X	X	X				
SS07	8/30	1225		X	WAI SS07 SW01	5	X		X		X			
SS07	8/30	1150		X	WAI SS07 SW02	5	X		X		X			
SS07	8/30	1215		X	WAI SS07 SW03	4	X		X					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	8/30/93 [illegible]	[illegible]	[illegible]	8/31/93 [illegible]	[illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

ANCHORAGE (1)

NO. 0469

PROJ. NO. WAINWRIGHT

PROJECT NAME: DEW LINE

SAMPLERS: (Signature) [illegible] Lemmon; Kerry [illegible]

YR MO NO.

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA	SEMI	T METAL	D. METAL	TOC	TDS	TSS	REMARKS
SS07	8/30	1135		X	WAI SS07 SW01	7	X	X	X	X				
SS07	8/30	1215		X	WAI SS07 SW03	7	X	X	X	X				
SS07	8/30	1145		X	WAI SS07 S01	3	X	X	X					
SS07	8/30	1145		X	WAI SS07 S03	3	X	X	X					
SS07	8/30	1215		X	WAI SS07 SD01	3	X	X	X					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible] Lemmon	8/30/93 1946	[signature]	SPEED MARK 0456-7644	8-30-93 2038	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0470

PROJ. NO.	PROJECT NAME	NO. YR MO
WAINWRIGHT	DEW LINE	

SAMPLERS: (Signature) [signatures]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	VOA	SEMI	T. METAL	D. METAL	TOC	TDS	TSS	REMARKS
SS04	8/30	1400		X	WAI SS04 SW01 /	22	X	X			X	X	X	MS/MSD
SS04	8/30	1400		X	WAI SS04 SW04 /	8	X	X			X	X	X	
TB	1200	8/30		X	WAI TB 02 /	2	X							

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8-30-93 / 1647	[signature]	SPEED MARK 0956-7670	8-30-93 / 2038	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

8A[illegible]

NO. 0471

PROJ. NO. WAINWRIGHT

PROJECT NAME: DEW LINE

SAMPLERS: (Signature) [illegible] Lemma, [illegible]

YR MO NO.

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	BTEX	BTEX+HVOC	TPH	PCB	PEST		REMARKS
SS04	8/30	1400		X	WAI-SS04-SW01	12	X		X				MS/MSD
SS04	8/30	1400		X	WAI SS04-SW04	4	X		X				
TB	8/30	1200		X	WAI TB-02	2		X					
AB	8/30	1600		X	WAI-AB-01	2		X					
SS04	8/30	1625		X	WAI-SS04-SW02	4	X		X				
SS04	8/30	1550		X	WAI-SS04-SW03	4	X		X				
SS04	8/30	1450		X	WAI-SS04-SD01	4	X		X				MS/MSD
SS04	8/30	1630		X	WAI-SS04-SD02	2	X		X				
SS04	8/30	1600		X	WAI-SS04-SD03	2	X		X				
SS04	8/30	1615		X	WAI-SS04-SD04	2	X		X				
SS09	8/30	1715		X	WAI-SS09-SW01	5		X	X	X			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mengistu Lemma	8/31/93 7:39	[illegible]	[illegible]	8-30-93 21:40	8-30 [illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS — CHAIN OF CUSTODY RECORD

BARROW (3)

NO. 0472

PROJ. NO.	PROJECT NAME	YR MO NO.
WAINWRIGHT	DEW LINE	

SAMPLERS: (Signature) [signature] Mike Lindgren / ferry Pueneld / [illegible] McGhan

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	BTEX	BTEX+HVOC	TPH	PCB	PEST			REMARKS
SS04	8/30	1510		X	WAI-SS04-S01	2	X		X	X				
SS04	8/30	1510		X	WAI-SS04-S02	2	X		X	X	X			
SS04	8/30	1555		X	WAI-SS04-S03	2	X		X	X				
SS04	8/30	1515		X	WAI-SS04-S04	2	X		X	X	X			
SS04	8/30	1510		X	WAI-SS04-S05	2	X		X	X				
SS04	8/30	1605		X	WAI-SS04-S06	2	X		X	X				
SS09	8/30	1745		X	WAI-SS09-SD01	2		X	X	X				
SS09	8/30	1515		X	WAI-SS09-S01	2		X	X	X				
SS09	8/30	1530		X	WAI-SS09-S02-2.5	4		X	X	~~X~~ OK				MS/MSD
SS09	8/30	1556		X	WAI-SS09-S03	2		X	X	X				
EB	8/30	1745		X	WAI EB 02	5		X	X	X	X			
SS09	8/30	1710		X	WAI SS09 S04	2		X	X	X				
SS09	8/30	1700		X	WAI SS09 S05	2		X	X	X				
SS09	8/30	1517		X	WAI SS09 S06	2		X	X	X				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8-30-93 2140	[signature] 8-30-93			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

ANCHORAGE (??)

NO. 0473

PROJ. NO.	PROJECT NAME
WAINWRIGHT	DEW LINE

SAMPLERS: (Signature) [illegible]

YR MO NO.

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA	SEMI	T METAL	D. METAL	TOC	TSS	TDS	REMARKS
SS04	8/30	1450		X	WAI - SS04 - SD01	4	X	X						MS/MSD
SS04	8/30	1510		X	WAI - SS04 - S01	2	X	X						
SS04	8/30	1510		X	WAI - SS04 - S05	2	X	X						
SS09	8/30	1556		X	WAI - SS09 - S03	3	X	X	X					
SS09	8/30	1517		X	WAI SS09 - S06	3	X	X	X					
EB	8/30	1745		X	WAI - EB - 02	7	X	X	X		X			
SS09	8/30	1715		X	WAI SS09 SW01	10	X	X	X	X	X	X	X	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	8-30-93 / 1948	[illegible]	TO Speed Mark 0456-7681	8-30-93 / 2038	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

APPENDIX F

ANALYTICAL DATA

1. SUMMARY TABLES OF ANALYTICAL DATA (presented in Sections 3.0 and 4.0)
2. CROSS-REFERENCE TABLE FOR SAMPLE IDENTIFICATION
3. ANALYTICAL DATA (for each site CT&E Data is presented first followed by F&B Data)

1. SUMMARY TABLES OF ANALYTICAL DATA (presented in Sections 3.0 and 4.0)

2. CROSS-REFERENCE TABLE FOR SAMPLE IDENTIFICATION

CROSS-REFERENCE SAMPLE IDENTIFICATION

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Drum Storage Area (ST02)									
WAI-ST02-S01	WAI-ST02-S01	ST02		463		1210		#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-ST02-S02	WAI-ST02-S02	ST02	464	463	93.4479-4	1212	93.4479	#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-ST02-S03	WAI-ST02-S03	ST02		463		1214		#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-ST02-S04	WAI-ST02-S04	ST02	464	463	93.4479-3	1216	93.4479	#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-ST02-S05	WAI-ST02-S05	ST02		463		1218		#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-ST02-S06	WAI-ST02-S06	ST02		463		1220		#6 - 08/31/93 #3&4 - 09/02/93	Field Replicate Soil

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Diesel Fuel Spills (SS04)									
WAI-SS04-S01	WAI-SS04-S01	SS04	473	472	93.4483-2	1478	93.4483	#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS04-S02-1	WAI-SS04-S02	SS04		472		1480		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS04-S03-1	WAI-SS04-S03	SS04		472		1482		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS04-S04-1	WAI-SS04-S04	SS04		472		1484		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS04-S05	WAI-SS04-S05	SS04	473	472	93.4483-3	1486	93.4483	#5 - 09/01/93 #3&4 - 09/02/93	Field Replicate Soil
WAI-SS04-S06-1.5	WAI-SS04-S06-1.5	SS04		472		1488		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS04-2S07	WAI-SS04-2S07	SS04		447		1877		#6 - 09/10/93 #1&2 - 09/10/93	Soil
WAI-SS04-2S07DP	WAI-SS04-2S07	SS04		447		1877dup		#6 - 09/10/93	Surface Water Duplicate
WAI-SS04-2S07S	WAI-SS04-2S07	SS04		447		1877ms		#6 - 09/10/93 #1&2 - 09/10/93	Surface Water Spike
WAI-SS04-2S07SD	WAI-SS04-2S07	SS04		447		1877msd		#6 - 09/10/93 #1&2 - 09/10/93	Surface Water Spike Duplicate
WAI-SS04-2S08-1	WAI-SS04-2S08	SS04	438	447	93.4695-1	1878	93.4695	#6 - 09/10/93	Soil
WAI-SS04-SD01-1	WAI-SS04-SD01	SS04	473	471	93.4483-1	1440	93.4483	#5 - 09/01/93 #3&4 - 09/04/93	Sediment
WAI-SS04-SD02-1	WAI-SS04-SD02	SS04		471		1434		#5 - 09/01/93 #3&4 - 09/04/93	Sediment
WAI-SS04-SD03	WAI-SS04-SD03	SS04		471		1436		#5 - 09/01/93 #3&4 - 09/04/93	Sediment

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Diesel Fuel Spills (SS04) (Continued)									
WAI-SS04-SD04-1	WAI-SS04-SD04	SS04		471		1438		#5 - 09/01/93 #3&4 - 09/04/93	Sediment
WAI-SS04-SW01	WAI-SS04-SW01	SS04	470	471	93.4482-1	1406 1408	93.4482	#5 - 09/01/93 #1&2 - 09/02/93	Surface Water
WAI-SS04-SW01DP	WAI-SS04-SW01	SS04	470	471	93.4482-2	1410dup	93.4482	#1&2 - 09/02/93	Surface Water Duplicate
WAI-SS04-SW01S	WAI-SS04-SW01	SS04	470		93.4482-3		93.4482		Surface Water Spike
WAI-SS04-SW01SD	WAI-SS04-SW01	SS04	470		93.4482-4		93.4482		Surface Water Spike Duplicate
WAI-SS04-SW02	WAI-SS04-SW02	SS04		471		1426 1428		#5 - 09/01/93 #1&2 - 09/02/93	Surface Water
WAI-SS04-SW03	WAI-SS04-SW03	SS04		471		1430 1432		#5 - 09/01/93 #1&2 - 09/02/93	Surface Water
WAI-SS04-SW04	WAI-SS04-SW04	SS04	470	471	93.4482	1417 1418	93.4482	#5 - 09/01/93 #1&2 - 09/02/93	Field Duplicate Surface Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Landfill (LF05)									
WAI-LF05-S01-1	WAI-LF05-S01-1	LF05		463		1222		#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-LF05-S02-1	WAI-LF05-S02-1	LF05		463		1224		#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-LF05-S03-1	WAI-LF05-S03-1	LF05		463		1226		#6 - 08/31/93 #3&4 - 09/02/93	Soil
WAI-LF05-S04-1.5	WAI-LF05-S04-1.5	LF05	464	463	93.4479-2	1228	93.4479	#6 - 08/31/93 #6 - 09/03/93 #3&4 - 09/02/93	Soil
WAI-LF05-S04-1.5DP	WAI-LF05-S04-1.5	LF05		463		1228dup		#6 - 08/31/93 #6 - 09/03/93 #3&4 - 09/02/93	Soil Duplicate
WAI-LF05-S04-1.5S	WAI-LF05-S04-1.5	LF05		463		1228ms		#6 - 08/31/93	Soil Spike
WAI-LF05-S04-1.5SD	WAI-LF05-S04-1.5	LF05		463		1228msd		#6 - 08/31/93	Soil Spike Duplicate
WAI-LF05-S07-1	WAI-LF05-S07-1	LF05		463		1230		#6 - 08/31/93 #3&4 - 09/02/93	Field Replicate Soil
WAI-LF05-SD01	WAI-LF05-SD01	LF05		463		1232		#6 - 08/31/93 #3&4 - 09/02/93	Sediment
WAI-LF05-SD02	WAI-LF05-SD02	LF05	464	463	93.4479-1	1234	93.4479	#6 - 08/31/93 #3&4 - 09/02/93	Sediment
WAI-LF05-SW01	WAI-LF05-SW01	LF05	465	462	93.4478-1	1255 1256 1258	93.4478	#5 - 09/01/93 #3&4 - 09/02/93	Surface Water
WAI-LF05-SW02	WAI-LF05-SW02	LF05	465	462	93.4478-2	1250 1252	93.4478	#5 - 09/01/93 #3&4 - 09/02/93	Surface Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Garage (SS07)									
WAI-SS07-S01	WAI-SS07-S01	SS07	469	468	93.4484-3	1458	93.4484	#5 - 09/01/93 #3&4 - 09/02/93 #3&4 - 09/04/93	Soil
WAI-SS07-S02	WAI-SS07-S02	SS07		468		1460		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS07-S03	WAI-SS07-S03	SS07	469	468	93.4484-4	1462	93.4484	#5 - 09/01/93 #3&4 - 09/02/93	Field Replicate Soil
WAI-SS07-SD01	WAI-SS07-SD01	SS07	469	468	93.4484-5	1452	93.4484	#5 - 09/01/93 #3&4 - 09/04/93	Sediment
WAI-SS07-SD01DP	WAI-SS07-SD01	SS07		468		1452dup		#5 - 09/01/93 #3&4 - 09/04/93	Sediment Duplicate
WAI-SS07-SD01S	WAI-SS07-SD01	SS07		468		1452ms		#5 - 09/01/93 #3&4 - 09/04/93	Sediment Spike
WAI-SS07-SD01SD	WAI-SS07-SD01	SS07		468		1452msd		#5 - 09/01/93 #3&4 - 09/04/93	Sediment Spike Duplicate
WAI-SS07-SD02	WAI-SS07-SD02	SS07		468		1454		#5 - 09/01/93 #3&4 - 09/02/93	Sediment
WAI-SS07-SD03	WAI-SS07-SD03	SS07		468		1456		#5 - 09/01/93 #3&4 - 09/02/93	Sediment
WAI-SS07-SD04	WAI-SS07-SD04	SS07		468		1450		#5 - 09/01/93 #3&4 - 09/02/93	Sediment
WAI-SS07-2SD05	WAI-SS07-2SD05	SS07		454		1891		#6 - 09/10/93	Sediment
WAI-SS07-2SD06	WAI-SS07-2SD06	SS07	438	454	93.4695-2	1892	93.4695	#6 - 09/10/93	Sediment
WAI-SS07-SW01	WAI-SS07-SW01	SS07	469	468	93.4484-1	1464 1466	93.4484	#5 - 09/01/93 #1&2 - 09/02/93	Surface Water
WAI-SS07-SW02	WAI-SS07-SW02	SS07		468		1468 1470		#5 - 09/01/93 #1&2 - 09/02/93	Surface Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Garage (SS07) (Continued)									
WAI-SS07-SW03	WAI-SS07-SW03	SS07	469	468	93.4484-2	1474	93.4484	#5 - 09/01/93 #1&2 - 09/02/93	Surface Water
WAI-SS07-2SW04	WAI-SS07-2SW04	SS07		454		1888		#6 - 09/09/93	Surface Water
WAI-SS07-2SW05	WAI-SS07-2SW05	SS07		454		1889		#6 - 09/09/93	Surface Water
WAI-SS07-2SW06	WAI-SS07-2SW06	SS07		454		1890		#6 - 09/09/93	Field Replicate Surface Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Air Strip Diesel Spill (SS08)									
WAI-SS08-SD01	WAI-SS08-SD01	SS08		462		1240		#6 - 08/31/93 #3&4 - 09/02/93	Sediment
WAI-SS08-SD02	WAI-SS08-SD02	SS08	467	462	93.4480-1	1242	93.4480	#6 - 08/31/93 #3&4 - 09/02/93	Sediment
WAI-SS08-SD03	WAI-SS08-SD03	SS08		462		1244		#6 - 08/31/93 #3&4 - 09/02/93	Sediment
WAI-SS08-SD04	WAI-SS08-SD04	SS08		462		1246		#6 - 08/31/93 #3&4 - 09/02/93	Sediment
WAI-SS08-SD05	WAI-SS08-SD05	SS08		462		1248		#6 - 08/31/93	Field Replicate Sediment
WAI-SS08-SW01	WAI-SS08-SW01	SS08		466		1267 1268		#5 - 09/01/93 #3&4 - 09/02/93	Surface Water
WAI-SS08-SW02	WAI-SS08-SW02	SS08	467	466	93.4480-2	1262 1264	93.4480	#5 - 09/01/93 #3&4 - 09/02/93	Surface Water
WAI-SS08-SW03	WAI-SS08-SW03	SS08		466		1271 1272		#5 - 09/01/93 #3&4 - 09/02/93	Surface Water
WAI-SS08-SW04	WAI-SS08-SW04	SS08		466		1275 1276		#5 - 09/01/93 #3&4 - 09/02/93	Field Duplicate Surface Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Vehicle Storage Area (SS09)									
WAI-SS09-S01-2.5	WAI-SS09-S01	SS09		472		1492		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS09-S02-2.5	WAI-SS09-S02-2.5	SS09		472		1494		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS09-S03-4	WAI-SS09-S03	SS09	473	472	93.4483-4	1496	93.4483	#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS09-S03-4DP	WAI-SS09-S03	SS09	473		93.4483-5		93.4483		Soil Duplicate
WAI-SS09-S03-4S	WAI-SS09-S03	SS09	473		93.4483-6		93.4483		Soil Spike
WAI-SS09-S04-0.75	WAI-SS09-S04	SS09		472		1502		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS09-S05-0.75	WAI-SS09-S05	SS09		472		1504		#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS09-S06	WAI-SS09-S06	SS09	473	472	93.4483-8	1506	93.4483	#5 - 09/01/93 #3&4 - 09/02/93	Soil
WAI-SS09-2S07-1.5	WAI-SS09-2S07	SS09		454		1898		#6 - 09/10/93 #1&2 - 09/10/93	Soil
WAI-SS09-SD01	WAI-SS09-SD01	SS09		472		1490		#5 - 09/01/93 #3&4 - 09/02/93	Sediment
WAI-SS09-2SD02	WAI-SS09-2SD02	SS09		447		1884		#6 - 09/10/93 #1&2 - 09/10/93	Sediment
WAI-STKP-S01	WAI-STKP-S01	SS09	438	454	93.4695-4	1900	93.4695	#6 - 09/10/93 #1&2 - 09/10/93	Soil
WAI-STKP-S02	WAI-STKP-S02	SS09	438	454	93.4695-5	1902	93.4695	#6 - 09/10/93 #1&2 - 09/10/93	Soil

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Vehicle Storage Area (SS09) (Continued)									
WAI-SS09-SW01	WAI-SS09-SW01	SS09	473	471	93.4483-10	1406 1408	93.4483	#5 - 09/01/93 #1&2 - 09/02/93	Surface Water
WAI-SS09-SW01DP	WAI-SS09-SW01	SS09	473		93.4483-11		93.4483		Surface Water Duplicate
WAI-SS09-SW01S	WAI-SS09-SW01	SS09	473		93.4483-12		93.4483		Surface Water Spike
WAI-SS09-2SW02	WAI-SS09-2SW02	SS09	439	447	93.4694-5	1880 1882	93.4694	#6 - 09/09/93 #1&2 - 09/07/93	Surface Water
WAI-SS09-2SW02DP	WAI-SS09-2SW02	SS09	439		93.4694-6		93.4694		Surface Water Duplicate
WAI-SS09-2SW02S	WAI-SS09-2SW02	SS09	439		93.4694-7		93.4694		Surface Water Spike

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Background (BKGD)									
WAI-BKGD-S01-0.5	WAI-BKGD-S01	BKGD	464	462	93.4479-6	1236	93.4479	#6 - 08/31/93 #6 - 09/03/93 #3&4 - 09/02/93	Soil
WAI-BKGD-S01-0.5DP	WAI-BKGD-S01	BKGD		462		1236dup		#6 - 08/31/93	Soil Duplicate
WAI-BKGD-S01-0.5S	WAI-BKGD-S01	BKGD		462		1236ms		#6 - 08/31/93	Soil Spike
WAI-BKGD-S01-0.5SD	WAI-BKGD-S01	BKGD		462		1236msd		#6 - 08/31/93	Soil Spike Duplicate
WAI-BKGD-2S02-1	WAI-BKGD-2S02	BKGD	439	447	93.4694-4	1876	93.4694	#6 - 09/10/93 #1&2 - 09/10/93	Soil
WAI-BKGD-SD01-0.5	WAI-BKGD-SD01	BKGD	464	462	93.4479-5	1238	93.4479	#6 - 08/31/93 #6 - 09/03/93 #3&4 - 09/02/93	Sediment
WAI-BKGD-2SD02-1	WAI-BKGD-2SD02	BKGD	439	447	93.4694-1	1874	93.4694	#6 - 09/10/93 #1&2 - 09/10/93	Sediment
WAI-BKGD-2SD02-1DP	WAI-BKGD-2SD02	BKGD	439		93.4694-2		93.4694		Sediment Duplicate
WAI-BKGD-2SD02-1S	WAI-BKGD-2SD02	BKGD	439		93.4694-3		93.4694		Sediment Spike
WAI-BKGD-SW01	WAI-BKGD-SW01	BKGD	467	466	93.4480-3	1284 1286	93.4480	#5 - 09/01/93 #3&4 - 09/02/93	Surface Water
WAI-BKGD-2SW02	WAI-BKGD-2SW02	BKGD	439	447	93.4694-8	1869 1870 1904	93.4694	#6 - 09/09/93 #1&2 - 09/07/93	Surface Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
QA/QC									
WAI-AB01	WAI-AB01	QA/QC		471		1424		#1&2 - 09/02/93	Ambient Blank
WAI-EB01	WAI-EB01	QA/QC	464	466	93.4479-7	1280 1282	93.4479	#5 - 09/01/93 #3&4 - 09/02/93	Equipment Blank
WAI-EB02	WAI-EB02	QA/QC	478	472	93.4483-9	1498 1500	93.4483	#5 - 09/01/93 #1&2 - 09/02/93	Equipment Blank
WAI-2EB03	WAI-2EB03	QA/QC	438	454	93.4695-3	1894 1896	93.4695	#6 - 09/09/93 #1&2 - 09/07/93	Equipment Blank
WAI-TB01	WAI-TB01	QA/QC		462	93.4479-8	1260	93.4479	#3&4 - 09/02/93	Trip Blank
WAI-TB02	WAI-TB02	QA/QC	470	471	93.4482-6	1422	93.4482	#1&2 - 09/02/93	Trip Blank
WAI-2TB03	WAI-TB03	QA/QC	439	447	93.4694-9	1886	93.4694	#1&2 - 09/07/93	Trip Blank

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

3. ANALYTICAL DATA

ANALYTICAL DATA SHEETS FOR THE DRUM STORAGE AREA (ST02)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

mlab Ref.# :93.4479-4
Client Sample ID :WAI ST02 S02
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 14:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T. THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromobenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromochloromethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromoform	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromomethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
n-Butylbenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
sec-Butylbenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
tert-Butylbenzne	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Carbon Tetrachloride	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chlorobenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroform	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloromethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Chlorotoluene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
4-Chlorotoluene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
12Dibromo3Chloropropane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dibromoethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromomethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,4-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dichlorodifluoromethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloroethane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
cis-1,2-Dichloroethene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
trans1,2-Dichloroethene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloropropane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichloropropane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2,2-Dichloropropane	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloropropene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Ethylbenzene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Hexachlorobutadiene	0.030	U	mg/Kg	EPA 8260		09/01	09/06	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-4
Client Sample ID :WAI ST02 S02
Matrix :SOIL

Isopropylbenzene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p-Isopropyltoluene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Methylene Chloride	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Napthalene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
n-Propylbenzene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Styrene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1112-Tetrachloroethane	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Tetrachloroethene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Toluene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichlorobenzene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trichlorobenzene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,1-Trichloroethane	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,2-Trichloroethane	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichloroethene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichloropropane	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trimethylbenzene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,3,5-Trimethylbenzene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p+m-Xylene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
o-Xylene	0.030	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Semivolatile Organics				EPA 8270			
Phenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethyl)ether	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chlorophenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,3-Dichlorobenzene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,4-Dichlorobenzene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzyl Alcohol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2-Dichlorobenzene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylphenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroisopropyl)e	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Methylphenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitroso-di-n-Propylam	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachloroethane	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Nitrobenzene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Isophorone	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitrophenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dimethylphenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzoic Acid	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethoxy)Meth	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dichlorophenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2,4-Trichlorobenzene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Naphthalene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloroaniline	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobutadiene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloro-3-Methylphenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylnaphthalene	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorocyclopentadie	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4,6-Trichlorophenol	5.70	U	mg/Kg	EPA 8270	09/12	10/19	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1909

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-4
Client Sample ID :WAI ST02 S02
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2,4,5-Trichlorophenol	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
2-Chloronaphthalene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
2-Nitroaniline	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dimethylphthalate	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Acenaphthylene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,6-Dinitrotoluene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
3-Nitroaniline	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Acenaphthene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,4-Dinitrophenol	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Nitrophenol	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dibenzofuran	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,4-Dinitrotoluene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Diethylphthalate	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Chlorophenyl-Phenylet	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Fluorene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Nitroaniline	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
4,6-Dinitro-2-Methylphe	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
n-Nitrosodiphenylamine	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Bromophenyl-Phenyleth	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Hexachlorobenzene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Pentachlorophenol	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Phenanthrene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Anthracene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
di-n-Butylphthalate	8.08	B	mg/Kg	EPA 8270		09/12	10/19	GV
Fluoranthene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Pyrene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Butylbenzylphthalate	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
3,3-Dichlorobenzidine	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(a)Anthracene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Chrysene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
bis(2-Ethylhexyl)Phthal	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
di-n-Octylphthalate	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(b)Fluoranthene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(k)Fluoranthene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(a)Pyrene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Indeno(1,2,3-cd)Pyrene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dibenz(a,h)Anthracene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(g,h,i)Perylene	5.70	U	mg/Kg	EPA 8270		09/12	10/19	GV
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	9600		mg/Kg	EPA 6010		09/08	09/20	DFL
Antimony	61	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Arsenic	6.1	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Barium	150		mg/Kg	EPA 6010		09/08	09/20	DFL
Beryllium	31	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cadmium	31	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Calcium	910		mg/Kg	EPA 6010		09/08	09/20	DFL
Chromium	31	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cobalt	6.1	U	mg/Kg	EPA 6010		09/08	09/20	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1909

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-4
Client Sample ID :WAI ST02 S02
Matrix :SOIL

Copper	8.5		mg/Kg	EPA 6010	09/08	09/20	DFL
Iron	27000		mg/Kg	EPA 6010	09/08	09/20	DFL
Lead	61	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Magnesium	1300		mg/Kg	EPA 6010	09/08	09/20	DFL
Manganese	170		mg/Kg	EPA 6010	09/08	09/20	DFL
Molybdenum	3.1	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Nickel	12		mg/Kg	EPA 6010	09/08	09/20	DFL
Potassium	930		mg/Kg	EPA 6010	09/08	09/21	DFL
Selenium	61	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Silver	31	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Sodium	170		mg/Kg	EPA 6010	09/08	09/20	DFL
Thallium	0.30	U	mg/Kg	EPA 7841	09/08	09/10	KAW
Vanadium	35		mg/Kg	EPA 6010	09/08	09/20	DFL
Zinc	25		mg/Kg	EPA 6010	09/08	09/20	DFL

* See Spec[illegible]structions Above
** See Samp[illegible]marks Above
U = Undetect[illegible] Reported value is the practical quantification limit.
D = Secondary [illegible]ilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-3
Client Sample ID :WAI ST02 S04
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 14:50 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T. THIS/FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromochloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromoform	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromomethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
n-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
sec-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
tert-Butylbenzne	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Carbon Tetrachloride	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroform	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
4-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
12Dibromo3Chloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dibromoethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromomethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,4-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dichlorodifluoromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
cis-1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
trans1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloropropene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Hexachlorobutadiene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-3
Client Sample ID :WAI ST02 S04
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Isopropylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p-Isopropyltoluene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Methylene Chloride	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Napthalene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
n-Propylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Styrene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1112-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Tetrachloroethene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Toluene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,1-Trichloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,2-Trichloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichloroethene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichloropropane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,3,5-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p+m-Xylene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethyl)ether	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chlorophenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,3-Dichlorobenzene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,4-Dichlorobenzene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzyl Alcohol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2-Dichlorobenzene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylphenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroisopropyl)e	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Methylphenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitroso-di-n-Propylam	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachloroethane	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Nitrobenzene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Isophorone	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitrophenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dimethylphenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzoic Acid	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroet[illegible]ch	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dichlorophen[illegible]	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2,4-Trichlorobenzene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Naphthalene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloroaniline	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobutadiene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloro-3-Methylphenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylnaphthalene	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorocyclopentadie	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4,6-Trichlorophenol	0.220	U	mg/Kg	EPA 8270	09/12	10/19	GV

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1923

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-3
Client Sample ID :WAI ST02 S04
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2,4,5-Trichlorophenol	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
2-Chloronaphthalene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
2-Nitroaniline	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dimethylphthalate	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Acenaphthylene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,6-Dinitrotoluene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
3-Nitroaniline	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Acenaphthene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,4-Dinitrophenol	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Nitrophenol	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dibenzofuran	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,4-Dinitrotoluene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Diethylphthalate	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Chlorophenyl-Phenylet	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Fluorene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Nitroaniline	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
4,6-Dinitro-2-Methylphe	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
n-Nitrosodiphenylamine	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Bromophenyl-Phenyleth	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Hexachlorobenzene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Pentachlorophenol	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Phenanthrene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Anthracene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
di-n-Butylphthalate	1.60	B	mg/Kg	EPA 8270		09/12	10/19	GV
Fluoranthene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Pyrene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Butylbenzylphthalate	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
3,3-Dichlorobenzidine	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(a)Anthracene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Chrysene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
bis(2-Ethylhexyl)Phthal	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
di-n-Octylphthalate	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(b)Fluoranthene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(k)Fluoranthene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(a)Pyrene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Indeno(1,2,3-cd)Pyrene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dibenz(a,h)Anthracene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(g,h,i)Perylene	0.220	U	mg/Kg	EPA 8270		09/12	10/19	GV
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	2600		mg/Kg	EPA 6010		09/08	09/20	DFL
Antimony	51	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Arsenic	51	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Barium	180		mg/Kg	EPA 6010		09/08	09/20	DFL
Beryllium	26	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cadmium	26	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Calcium	15000		mg/Kg	EPA 6010		09/08	09/20	DFL
Chromium	26	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cobalt	15		mg/Kg	EPA 6010		09/08	09/20	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STRE...
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-3
Client Sample ID :WAI ST02 S04
Matrix :SOIL

Copper	9.3		mg/Kg	EPA 6010	09/08	09/20	DFL
Iron	110000		mg/Kg	EPA 6010	09/08	09/20	DFL
Lead	19		mg/Kg	EPA 6010	09/08	09/20	DFL
Magnesium	5300		mg/Kg	EPA 6010	09/08	09/20	DFL
Manganese	1400		mg/Kg	EPA 6010	09/08	09/20	DFL
Molybdenum	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Nickel	24		mg/Kg	EPA 6010	09/08	09/20	DFL
Potassium	590		mg/Kg	EPA 6010	09/08	09/21	DFL
Selenium	510	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Silver	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Sodium	840		mg/Kg	EPA 6010	09/08	09/20	DFL
Thallium	0.25	U	mg/Kg	EPA 7841	09/08	09/10	KAW
Vanadium	39		mg/Kg	EPA 6010	09/08	09/20	DFL
Zinc	66		mg/Kg	EPA 6010	09/08	09/20	DFL

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	WAI-ST02-S01	WAI-ST02-S02	WAI-ST02-S03	WAI-ST02-S04	WAI-ST02-S05
F&BI Number	1210	1212	1214	1216	1218
Sample Type	soil	soil	soil	soil	soil
Date Received	8/29/93	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight	74	81	74	86	95
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
Leaded Gas					
JP-4	<70	<60	<70	<60	<50
Lube Oil	<140	<120	<140	<120	<100
Diesel	<70	<60	<70	<60	<50
Spike Level					
Unknown Semi-volatile					
Pentacosane	100	130	116	100	96
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
PCB 1221	<0.1	<0.1	<0.1	<0.1	<0.1
PCB 1232	<0.1	<0.1	<0.1	<0.1	<0.1
PCB 1016	<0.1	<0.1	<0.1	<0.1	<0.1
PCB 1242	<0.1	<0.1	<0.1	<0.1	<0.1
PCB 1248	<0.1	<0.1	<0.1	<0.1	<0.1
PCB 1254	<0.1	<0.1	<0.1	<0.1	<0.1
PCB 1260	<0.1	<0.1	<0.1	<0.1	<0.1
Spike Level					
Dibutyl Chlorendate	95	118	106	114	102
Sequence Date					
alpha-BHC					
beta-BHC					
gamma-BHC					
delta-BHC					
Heptachlor					
Aldrin					
Heptachlor Epoxide					
Endosulfan I					
DDE					
Dieldrin					
Endrin					
Endosulfan II					
DDD					
Endrin Aldehyde					
DDT					
Endosulfan Sulfate					
Endrin Ketone					
Methoxy Chlor					
Chlordane					
Dibutyl Chlorendate					
Spike Level					
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93
CCl4	<0.02	<0.02	<0.02	<0.02	<0.02
TCA	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	<0.02	<0.02	<0.02	<0.02	<0.02
TCE	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	<0.02	<0.02	<0.02	<0.02	<0.02
PCE	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	<0.02	<0.02	<0.02	<0.02	<0.02
Xylenes	<0.04	<0.04	<0.04	<0.04	<0.04
Gasoline	~~<1~~ <2J	~~<1~~ <2J	~~<1~~ <2J	~~<1~~ <2J	~~<1~~ <2
Spike level					
BFB	95	99	129	95	97

SMF
5.3.95

ICF ID	WAI-ST02-S06
F&BI Number	1220
Sample Type	soil
Date Received	8/29/93
% Dry Weight	87
Sequence Date	#6-08/31/93
Leaded Gas	
JP-4	<60
Lube Oil	<120
Diesel	<60
Spike Level	
Unknown Semi-volatile	
Pentacosane	119
Sequence Date	#6-08/31/93
PCB 1221	<0.1
PCB 1232	<0.1
PCB 1016	<0.1
PCB 1242	<0.1
PCB 1248	<0.1
PCB 1254	<0.1
PCB 1260	<0.1
Spike Level	
Dibutyl Chlorendate	117
Sequence Date	
alpha-BHC	
beta-BHC	
gamma-BHC	
delta-BHC	
Heptachlor	
Aldrin	
Heptachlor Epoxide	
Endosulfan I	
DDE	
Dieldrin	
Endrin	
Endosulfan II	
DDD	
Endrin Aldehyde	
DDT	
Endosulfan Sulfate	
Endrin Ketone	
Methoxy Chlor	
Chlordane	
Dibutyl Chlorendate	
Spike Level	
Vol Sequence	#3&4-09/02/93
CCl4	<0.02
TCA	<0.02
Benzene	<0.02
TCE	<0.02
Toluene	<0.02
PCE	<0.02
Ethylbenzene	<0.02
Xylenes	<0.04
Gasoline	~~57~~ <2
Spike level	
BFB	105

Smf 5.3.95

ANALYTICAL DATA SHEETS FOR THE DIESEL FUEL SPILLS (SS04)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4483-2
Client Sample ID :WAI-SS04-S01
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 15:10 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.
8270 NOT ANALYZED DUE TO HOLDING TIME BEING EXCEEDED.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromodichloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromoform	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
n-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
sec-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
tert-Butylbenzne	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Carbon Tetrachloride	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroform	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
4-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
12Dibromo3Chloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dibromoethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,4-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dichlorodifluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
cis-1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
trans1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloropropene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Ethylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Hexachlorobutadiene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Isopropylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-2
Client Sample ID :WAI-SS04-S01
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX (907) 561-5301

p-Isopropyltoluene	0.237	D	mg/Kg	EPA 8260	09/01	09/14	KWM
Methylene Chloride	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Napthalene	0.613	D	mg/Kg	EPA 8260	09/01	09/14	KWM
n-Propylbenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Styrene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1112-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1122-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Tetrachloroethene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Toluene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,1-Trichloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,2-Trichloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichloroethene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichlorofluoromethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichloropropane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trimethylbenzene	0.382	D	mg/Kg	EPA 8260	09/01	09/14	KWM
1,3,5-Trimethylbenzene	5.49	D	mg/Kg	EPA 8260	09/01	09/14	KWM
Vinyl Chloride	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
p+m-Xylene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
o-Xylene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Cemlab Ref.# :93.4483-3
Client Sample ID :WAI-SS04-S05
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 15:10 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromodichloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromoform	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
n-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
sec-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
tert-Butylbenzne	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Carbon Tetrachloride	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroform	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
4-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
12Dibromo3Chloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dibromoethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,4-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dichlorodifluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
cis-1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
trans1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloropropene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Ethylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Hexachlorobutadiene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Isopropylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM
p-Isopropyltoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/14	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-3
Client Sample ID :WAI-SS04-S05
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Napthalene	0.851	D	mg/Kg	EPA 8260	09/01	09/14	KWM
n-Propylbenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Styrene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1112-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1122-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Tetrachloroethene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Toluene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,[illegible]robenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,[illegible]ethane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,2[illegible]hane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichlo[illegible]	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichloro[illegible]ane	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Tri[illegible]ne	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trime[illegible]	0.849	D	mg/Kg	EPA 8260	09/01	09/14	KWM
1,3,5-Trimethy[illegible]	14.4	D	mg/Kg	EPA 8260	09/01	09/14	KWM
Vinyl Chloride	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
p+m-Xylene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
o-Xylene	0.200	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Semivolatile Organics				EPA 8270			
Phenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	[illegible]
bis(2-Chloroethyl)ether	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2-Chlorophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
1,3-Dichlorobenzene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
1,4-Dichlorobenzene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzyl Alcohol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
1,2-Dichlorobenzene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2-Methylphenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
bis(2-Chloroisopropyl)e	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Methylphenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
n-Nitroso-di-n-Propylam	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Hexachloroethane	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Nitrobenzene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Isophorone	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2-Nitrophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,4-Dimethylphenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzoic Acid	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
bis(2-Chloroethoxy)Meth	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,4-Dichlorophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
1,2,4-Trichlorobenzene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Naphthalene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Chloroaniline	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Hexachlorobutadiene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Chloro-3-Methylphenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2-Methylnaphthalene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Hexachlorocyclopentadie	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,4,6-Trichlorophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,4,5-Trichlorophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2-Chloronaphthalene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

emlab Ref.# :93.4483-3
Client Sample ID :WAI-SS04-S05
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX (907) 561-5301

2-Nitroaniline	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Dimethylphthalate	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Acenaphthylene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,6-Dinitrotoluene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
3-Nitroaniline	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Acenaphthene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,4-Dinitrophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Nitrophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Dibenzofuran	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
2,4-Dinitrotoluene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Diethylphthalate	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Chlorophenyl-Phenyiet	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Fluorene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Nitroaniline	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4,6-Dinitro-2-Methylphe	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
n-Nitrosodiphenylamine	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
4-Bromophenyl-Phenyleth	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Hexachlorobenzene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Pentachlorophenol	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Phenanthrene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Anthracene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
di-n-Butylphthalate	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Fluoranthene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
yrene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
utylbenzylphthalate	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
3,3-Dichlorobenzidine	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzo(a)Anthracene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Chrysene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
bis(2-Ethylhexyl)Phthal	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
di-n-Octylphthalate	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzo(b)Fluoranthene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzo(k)Fluoranthene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzo(a)Pyrene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Indeno(1,2,3-cd)Pyrene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Dibenz(a,h)Anthracene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV
Benzo(g,h,i)Perylene	2.20	U	mg/Kg	EPA 8270	09/13	10/21	GV

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* See Special Instructions Above
* See Sample Remarks Above
U ndetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-1
Client Sample ID :WAI SS04 2S08
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70794
Report Completed :11/04/93
Collected :09/07/93 @ 15:30 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	85.1		%	SM17 2540G			09/10	EAL
Hydrocarbons VPH	46.2		mg/Kg	EPA 5030/8015M		09/10	09/15	WLS
Hydrocarbons EPH	2220	D	mg/Kg	3510/3550/8100M		09/17	09/19	JBH

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4483-1
Client Sample ID :WAI-SS04-SD01
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 14:50 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.
8270 NOT ANALYZED DUE TO HOLDING TIME BEING EXCEEDED.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromobenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromochloromethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromodichloromethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromoform	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromomethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
n-Butylbenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
sec-Butylbenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
tert-Butylbenzne	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Carbon Tetrachloride	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chlorobenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroform	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloromethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2-Chlorotoluene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
4-Chlorotoluene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromochloromethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
12Dibromo3Chloropropane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dibromoethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromomethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichlorobenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichlorobenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,4-Dichlorobenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dichlorodifluoromethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloroethane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
cis-1,2-Dichloroethene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
trans1,2-Dichloroethene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloropropane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichloropropane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2,2-Dichloropropane	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloropropene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Ethylbenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Hexachlorobutadiene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Isopropylbenzene	0.075	U	mg/Kg	EPA 8260		09/01	09/14	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX (907) 561-5301

Chemlab Ref.# :93.4483-1
Client Sample ID :WAI-SS04-SD01
Matrix :SOIL

p-Isopropyltoluene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Methylene Chloride	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Napthalene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
n-Propylbenzene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Styrene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1112-Tetrachloroethane	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1122-Tetrachloroethane	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Tetrachloroethene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Toluene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichlorobenzene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trichlorobenzene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,1-Trichloroethane	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,2-Trichloroethane	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichloroethene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichlorofluoromethane	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichloropropane	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trimethylbenzene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,3,5-Trimethylbenzene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Vinyl Chloride	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
p+m-Xylene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM
o-Xylene	0.075	U	mg/Kg	EPA 8260	09/01	09/14	KWM

===

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

...E 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4482-1
Client Sample ID :WAI SS04 SW01
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70333
Report Completed :10/12/93
Collected :08/30/93 @ 14:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : Steph C. Ede

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4482-1
Client Sample ID :WAI SS04 SW01
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/06	10/06	[illegible]
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	[illegible]
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Isophorone	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Naphthalene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4482-1
Client Sample ID :WAI SS04 SW01
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Acenaphthene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Fluorene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Phenanthrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Anthracene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Pyrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Chrysene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	32.1-32.8		mg/L	EPA 9060			09/10	CMR
...TOC Concentration	32.5		mg/L	EPA 9060			09/10	CMR
Residue, Non-Filterable	28		mg/L	EPA 160.2			09/03	TAV
Residue,Filterable(TDS)	459		mg/L	EPA 160.1	500	09/16	09/17	RJK

* See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

5633 B STREE[T]
ANCHORAGE, AK 995[..]
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4482-2
Client Sample ID :WAI SS04 SW01 DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70333
Report Completed :10/12/93
Collected :08/30/93 @ 14:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	33.0		mg/L	EPA 9060			09/10	CMR
...TOC Concentration	31.8-34.8		mg/L	EPA 9060			09/10	CMR

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4482-3
Client Sample ID :WAI SS04 SW01 SPIKE
Matrix :WATER

Client Name	:ICF KAISER ENGINEERING	WORK Order	:70333
Ordered By	:RAY MORRIS	Report Completed	:10/12/93
Project Name	:DEW LINE	Collected	:08/30/93 @ 14:00 hrs.
Project#	:WAINWRIGHT	Received	:08/31/93 @ 12:00 hrs.
PWSID	:UA	Technical Director	:STEPHEN C. EDE
		Released By	:

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, PETER M.G., AND JERRY M. FOR 8260 SPIKE AND SPIKE DUPLICATE, SEE WO# 93.4483-11,12

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Semivolatile Organics				EPA 8270				
Phenol	0.017		mg/L	EPA 8270		09/06	10/06	GV
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2-Chlorophenol	0.038		mg/L	EPA 8270		09/06	10/06	GV
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
1,4-Dichlorobenzene	0.037		mg/L	EPA 8270		09/06	10/06	GV
Benzyl Alcohol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2-Methylphenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Methylphenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
n-Nitroso-di-n-Propylam	0.054		mg/L	EPA 8270		09/06	10/06	GV
Hexachloroethane	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Nitrobenzene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Isophorone	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2-Nitrophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzoic Acid	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
1,2,4-Trichlorobenzene	0.039		mg/L	EPA 8270		09/06	10/06	GV
Naphthalene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Chloroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Chloro-3-Methylphenol	0.054		mg/L	EPA 8270		09/06	10/06	GV
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Acenaphthene	0.043		mg/L	EPA 8270		09/06	10/06	GV
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/06	10/06	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4482-3
Client Sample ID :WAI SS04 SW01 SPIKE
Matrix :WATER

4-Nitrophenol	0.051		mg/L	EPA 8270		09/06	10/06	GV
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dinitrotoluene	0.062		mg/L	EPA 8270		09/06	10/06	GV
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Fluorene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Pentachlorophenol	0.102		mg/L	EPA 8270		09/06	10/06	GV
Phenanthrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Anthracene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
di-n-Butylphthalate	0.074		mg/L	EPA 8270		09/06	10/06	GV
Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Pyrene	0.088		mg/L	EPA 8270		09/06	10/06	GV
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Chrysene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	10/06	
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	10/06	
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/06	10/06	GV
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	46.0-47.0		mg/L	EPA 9060			09/10	CMR
...TOC Concentration	46.5		mg/L	EPA 9060			09/10	CMR

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
CE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

emlab Ref.# :93.4482-4
Client Sample ID :WAI SS04 SW01 SPIKE DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70333
Report Completed :10/12/93
Collected :08/30/93 @ 14:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, PETER M.G., AND JERRY M. FOR 8260 SPIKE AND SPIKE DUPLICATE, SEE WO# 93.4483-11,12

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Semivolatile Organics				EPA 8270				
Phenol	0.015		mg/Kg	EPA 8270		09/06	10/06	GV
bis(2-Chloroethyl)ether	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2-Chlorophenol	0.038		mg/Kg	EPA 8270		09/06	10/06	GV
1,3-Dichlorobenzene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
1,4-Dichlorobenzene	0.035		mg/Kg	EPA 8270		09/06	10/06	GV
Benzyl Alcohol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
1,2-Dichlorobenzene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2-Methylphenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
is(2-Chloroisopropyl)e	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
-Methylphenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
n-Nitroso-di-n-Propylam	0.054		mg/Kg	EPA 8270		09/06	10/06	GV
Hexachloroethane	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Nitrobenzene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Isophorone	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2-Nitrophenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2,4-Dimethylphenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Benzoic Acid	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
bis(2-Chloroethoxy)Meth	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2,4-Dichlorophenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
1,2,4-Trichlorobenzene	0.038		mg/Kg	EPA 8270		09/06	10/06	GV
Naphthalene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
4-Chloroaniline	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Hexachlorobutadiene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
4-Chloro-3-Methylphenol	0.059		mg/Kg	EPA 8270		09/06	10/06	GV
2-Methylnaphthalene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Hexachlorocyclopentadie	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2,4,6-Trichlorophenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2,4,5-Trichlorophenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2-Chloronaphthalene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2-Nitroaniline	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Dimethylphthalate	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Acenaphthylene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
2,6-Dinitrotoluene	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
3-Nitroaniline	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV
Acenaphthene	0.045		mg/Kg	EPA 8270		09/06	10/06	GV
2,4-Dinitrophenol	0.010	U	mg/Kg	EPA 8270		09/06	10/06	GV

COMMERCIAL TESTING & ENGINEERING CO.

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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
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Chemlab Ref.# :93.4482-4
Client Sample ID :WAI SS04 SW01 SPIKE DUPLICATE
Matrix :WATER

4-Nitrophenol	0.038		mg/Kg	EPA 8270	09/06	10/06	GV
Dibenzofuran	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
2,4-Dinitrotoluene	0.069		mg/Kg	EPA 8270	09/06	10/06	GV
Diethylphthalate	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
4-Chlorophenyl-Phenylet	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Fluorene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
4-Nitroaniline	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
4,6-Dinitro-2-Methylphe	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
n-Nitrosodiphenylamine	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
4-Bromophenyl-Phenyleth	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Hexachlorobenzene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Pentachlorophenol	0.097		mg/Kg	EPA 8270	09/06	10/06	GV
Phenanthrene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Anthracene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
di-n-Butylphthalate	0.084		mg/Kg	EPA 8270	09/06	10/06	GV
Fluoranthene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Pyrene	0.095		mg/Kg	EPA 8270	09/06	10/06	GV
Butylbenzylphthalate	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
3,3-Dichlorobenzidine	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Benzo(a)Anthracene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Chrysene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
bis(2-Ethylhexyl)Phthal	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
di-n-Octylphthalate	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Benzo(b)Fluoranthene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	[illegible]
Benzo(k)Fluoranthene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Benzo(a)Pyrene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Dibenz(a,h)Anthracene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV
Benzo(g,h,i)Perylene	0.010	U	mg/Kg	EPA 8270	09/06	10/06	GV

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
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LT = Less Than
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ENVIRONMENTAL LABORATORY SERVICES

CE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

mlab Ref.# :93.4482-5
Client Sample ID :WAI SS04 SW04
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70333
Report Completed :10/12/93
Collected :08/30/93 @ 14:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromochloromethane	0.0010	U	mg/L	EP		09/15	09/15	KWM
Bromodichloromethane	0.0010	U	mg/L	EF				KWM
Bromoform	0.0010	U	mg/L	EF				KWM
Bromomethane	0.0010	U	mg/L	EF				KWM
n-Butylbenzene	0.0010	U	mg/L	EI				KWM
sec-Butylbenzene	0.0010	U	mg/L	EI				KWM
tert-Butylbenzne	0.0010	U	mg/L	EI				KWM
Carbon Tetrachloride	0.0010	U	mg/L	EI				KWM
Chlorobenzene	0.0010	U	mg/L	E				KWM
Chloroethane	0.0010	U	mg/L	E				KWM
Chloroform	0.0010	U	mg/L	E				KWM
Chloromethane	0.0010	U	mg/L	E				KWM
2-Chlorotoluene	0.0010	U	mg/L	E				KWM
4-Chlorotoluene	0.0010	U	mg/L	E				KWM
Dibromochloromethane	0.0010	U	mg/L	I				KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	I				KWM
1,2-Dibromoethane	0.0010	U	mg/L	I				KWM
Dibromomethane	0.0010	U	mg/L					KWM
1,2-Dichlorobenzene	0.0010	U	mg/L					KWM
1,3-Dichlorobenzene	0.0010	U	mg/L					KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		[illegible]	[illegible]	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4482-5
Client Sample ID :WAI SS04 SW04
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/06	09/06	[illegible]
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Isophorone	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Naphthalene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/06	09/06	GV
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/06	09/06	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4482-5
Client Sample ID :WAI SS04 SW04
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Acenaphthene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Fluorene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Phenanthrene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Anthracene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Pyrene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Chrysene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/06	09/06	GV
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	29.3-30.7		mg/L	EPA 9060			09/10	CMR
...TOC Concentration	30.0		mg/L	EPA 9060			09/10	CMR
Residue, Non-Filterable	13		mg/L	EPA 160.2			09/03	TAV
Residue,Filterable(TDS)	465		mg/L	EPA 160.1	500	09/16	09/17	RJK

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* See Special Instructions Above
See Sample Remarks Above
Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	WAI-SS04-S01	WAI-SS04-S02	WAI-SS04-S03	WAI-SS04-S04	WAI-SS04-S05
F&BI Number	1478	1480	1482	1484	1486
Sample Type	soil	soil	soil	soil	soil
Date Received	8/30/93	8/30/93	8/30/93	8/30/93	8/30/93
% Dry Weight	90	90	108	68	91
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93
Leaded Gas					
JP-4	<50	<50	<50	<70	<50
Lube Oil	<110	<110	<100	<150	<110
Diesel	4600 J	<50	<50	<100	4900 J
Spike Level					
Unknown Semi-volatile					
Pentacosane	115	88	90	77	102
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93
PCB 1221	<0.1	<0.1	~~<0.1~~ <0.4	<0.1	<0.1
PCB 1232	<0.1	<0.1	~~<0.1~~	<0.1	<0.1
PCB 1016	<0.1	<0.1	~~<0.1~~	<0.1	<0.1
PCB 1242	<0.1	<0.1	~~<0.1~~	<0.1	<0.1
PCB 1248	<0.1	<0.1	~~<0.1~~	<0.1	<0.1
PCB 1254	<0.1	<0.1	~~<0.1~~	<0.1	<0.1
PCB 1260	<0.1	<0.1	~~<0.1~~	<0.1	<0.1
Spike Level					
Dibutyl Chlorendate	140	136	160	129	140
Sequence Date		#5-09/01/93		#5-09/01/93	
alpha-BHC		<0.01 J		<0.01 J	
beta-BHC		<0.01		<0.01	
gamma-BHC		<0.01		<0.01	
delta-BHC		<0.01		<0.01	
Heptachlor		<0.01		<0.01	
Aldrin		<0.01		<0.01	
Heptachlor Epoxide		<0.01		<0.01	
Endosulfan I		<0.01		<0.01	
DDE		<0.01		<0.01	
Dieldrin		<0.01		<0.01	
Endrin		<0.01		<0.01	
Endosulfan II		<0.01		<0.01	
DDD		<0.01		<0.01	
Endrin Aldehyde		<0.01		<0.01	
DDT		<0.01		<0.01	
Endosulfan Sulfate		<0.01		<0.01	
Endrin Ketone		<0.01		<0.01	
Methoxy Chlor		~~<0.1~~ <0.5 J		~~<0.1~~ <0.5 J	
Chlordane		<0.5 J		<0.5 J	
Dibutyl Chlorendate		84		83	
Spike Level					
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93
CCl4					
TCA					
Benzene	<0.2 J	<0.2 J	<0.2 J	<0.2 J	<0.2 J
TCE					
Toluene	<0.2 J	<0.2 J	<0.2 J	<0.2 J	<0.2 J
PCE	0.16				
Ethylbenzene	6 NJ	<0.2 J	<0.2 J	<0.2 J	7 NJ
Xylenes	~~12~~ 17 NJ	<0.4 J	<0.4 J	<0.4 J	17 NJ
Gasoline	~~100~~ 120 NJ	<2 J	<2 J	~~10~~ 14 NJ	~~110~~ 120 NJ
Spike level					
BFB	83	74	69	81	89

SMP
5:395

gul 5.3.95

ICF ID	WAI-SS04-S06 -1.5	WAI-SS04-2S07	WAI-SS04-2S07	WAI-SS04-2S07
F&BI Number	1488	1877	1877 dup	1877 ms
Sample Type	soil	soil	soil	soil
Date Received	8/30/93	9/7/93	9/7/93	9/7/93
% Dry Weight	73	87		
Sequence Date	#5-09/01/93	#6-09/10/93	#6-09/10/93	#6-09/10/93
Leaded Gas				
JP-4	<70	<70	<70	
Lube Oil	<140	<140	<140	
Diesel	<70	~~<70~~ <60J	<70	80
Spike Level				500
Unknown Semi-volatile				
Pentacosane	91	120	98	102
Sequence Date	#5-09/01/93			
PCB 1221	<0.1			
PCB 1232	<0.1			
PCB 1016	<0.1			
PCB 1242	<0.1			
PCB 1248	<0.1			
PCB 1254	<0.1			
PCB 1260	<0.1			
Spike Level				
Dibutyl Chlorendate	139			
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#3&4-09/02/93	#1&2-09/10/93		#1&2-09/10/93
CCl4		<0.1J		84
TCA		<0.1J		91
Benzene	<0.2J	<0.02		82
TCE		<0.1		100
Toluene	<0.2J	<0.02		87
PCE		<0.1		120
Ethylbenzene	<0.2J	<0.02		82
Xylenes	<0.4J	<0.04		82
Gasoline	<2J	<1J		
Spike level				
BFB	87	94		108

SMF 5-3-95

ICF ID	WAI-SS04-2S07	WAI-SS04-2S08-1	WAI-SS04-SD01-1	WAI-SS04-SD02-1
F&BI Number	1877 msd	1878	1440	1434
Sample Type	soil	soil	soil	soil
Date Received	9/7/93	9/7/93	8/30/93	8/30/93
% Dry Weight		88	21	15
Sequence Date	#6-09/10/93	#6-09/10/93	#5-09/01/93	#5-09/01/93
Leaded Gas				
JP-4		<80	<240	<330
Lube Oil		<160	<480	<670
Diesel	82	~~600~~ 750J	<240	<330
Spike Level	500			
Unknown Semi-volatile				
Pentacosane	101	120	105	96
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#1&2-09/10/93		#3&4-09/04/93	#3&4-09/04/93
CCl4	74			
TCA	74			
Benzene	67		<0.2 J	<0.2 J
TCE	70			
Toluene	76		<0.2 J	<0.2 J
PCE	91			
Ethylbenzene	101		<0.2 J	<0.2 J
Xylenes	76		<0.4 J	<0.4 J
Gasoline			<2 J	<2 J
Spike level				
BFB	105		70	66

Smf 5.3.95

ICF ID	WAI-SS04-SD03	WAI-SS04-SD04	WAI-SS04-SW01	WAI-SS04-SW01
F&BI Number	1436	1438	1406	1408
Sample Type	soil	soil	water	water
Date Received	8/30/93	8/30/93	8/30/93	8/30/93
% Dry Weight	49	91		
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	
Leaded Gas				
JP-4	<100	<50	<200	
Lube Oil	<200	<110	<2000	
Diesel	<100	<50	~~<200~~ <1000	
Spike Level				
Unknown Semi-volatile				
Pentacosane	94	114	90	
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#3&4-09/04/93	#3&4-09/04/93		#1&2-09/02/93
CCl4				
TCA				
Benzene	<0.2 J	<0.2 J		<1
TCE				
Toluene	<0.2 J	<0.2 J		<1
PCE				
Ethylbenzene	<0.2 J	<0.2 J		<1
Xylenes	<0.4 J	<0.4 J		<2
Gasoline	6 NJ	<2 J		<50 J
Spike level				
BFB	97	81		103

ICF ID	WAI-SS04-SW01	WAI-SS04-SW02	WAI-SS04-SW02	WAI-SS04-SW03
F&BI Number	1410 dup	1426	1428	1430
Sample Type	water	water	water	water
Date Received	8/30/93	8/30/93	8/30/93	8/30/93
% Dry Weight				
Sequence Date		#5-09/01/93		#5-09/01/93
Leaded Gas				
JP-4		<200		<200
Lube Oil		<2000		<2000
Diesel		~~<200~~ <1000		~~<200~~ <1000
Spike Level				
Unknown Semi-volatile				
Pentacosane		101		94
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#1&2-09/02/93		#1&2-09/02/93	
CCl4				
TCA				
Benzene	<1		<1	
TCE				
Toluene	<1		<1	
PCE				
Ethylbenzene	<1		<1	
Xylenes	<2		<2	
Gasoline	<50		<50 J	
Spike level				
BFB	102		99	

Smk 6-3-95

ICF ID	WAI-SS04-SW03	WAI-SS04-SW04	WAI-SS04-SW04
F&BI Number	1432	1417	1418
Sample Type	water	water	water
Date Received	8/30/93	8/30/93	8/30/93
% Dry Weight			
Sequence Date		#5-09/01/93	
Leaded Gas			
JP-4		<200	
Lube Oil		<2000	
Diesel		~~<200~~ <1000	
Spike Level			
Unknown Semi-volatile			
Pentacosane		105	
Sequence Date			
PCB 1221			
PCB 1232			
PCB 1016			
PCB 1242			
PCB 1248			
PCB 1254			
PCB 1260			
Spike Level			
Dibutyl Chlorendate			
Sequence Date			
alpha-BHC			
beta-BHC			
gamma-BHC			
delta-BHC			
Heptachlor			
Aldrin			
Heptachlor Epoxide			
Endosulfan I			
DDE			
Dieldrin			
Endrin			
Endosulfan II			
DDD			
Endrin Aldehyde			
DDT			
Endosulfan Sulfate			
Endrin Ketone			
Methoxy Chlor			
Chlordane			
Dibutyl Chlorendate			
Spike Level			
Vol Sequence	#1&2-09/02/93		#1&2-09/02/93
CCl4			
TCA			
Benzene	<1		<1 R
TCE			
Toluene	<1		<1 R
PCE			
Ethylbenzene	<1		<1 R
Xylenes	<2		<2 R
Gasoline	<50 J		<50 R
Spike level			
BFB	102		100

5.3.95

ANALYTICAL DATA SHEETS FOR THE LANDFILL (LF05)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-2
Client Sample ID :WAI LF05 S04-1.5
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 15:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T. B = THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromodichloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromoform	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
n-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
sec-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
tert-Butylbenzne	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Carbon Tetrachloride	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroform	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
4-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
12Dibromo3Chloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dibromoethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,4-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dichlorodifluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
cis-1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
trans1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloropropene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Ethylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Hexachlorobutadiene	0.200	U	mg/Kg	EPA 8260		09/01	09/06	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-2
Client Sample ID :WAI LF05 S04-1.5
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Qualifier/Comments

Isopropylbenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p-Isopropyltoluene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Methylene Chloride	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Napthalene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
n-Propylbenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Styrene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1112-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1122-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Tetrachloroethene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Toluene	0.205		mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,1-Trichloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,2-Trichloroethane	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichloroethene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichlorofluoromethane	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichloropropane	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trimethylbenzene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,3,5-Trimethylbenzene	0.247		mg/Kg	EPA 8260	09/01	09/06	KWM
Vinyl Chloride	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p+m-Xylene	0.211		mg/Kg	EPA 8260	09/01	09/06	KWM
o-Xylene	0.200	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.210	U	mg/Kg	EPA 8270 (R)-F.2	09/12	10/19	
bis(2-Chloroethyl)ether	0.210	U	mg/Kg	EPA 8270 (R)-F.2	09/12	10/19	GV
2-Chlorophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,3-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,4-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzyl Alcohol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylphenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroisopropyl)e	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Methylphenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitroso-di-n-Propylam	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachloroethane	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Nitrobenzene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Isophorone	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitrophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dimethylphenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzoic Acid	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethoxy)Meth	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dichlorophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2,4-Trichlorobenzene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Naphthalene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloroaniline	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobutadiene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloro-3-Methylphenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylnaphthalene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorocyclopentadie	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4,6-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV

CO
2-11-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

emlab Ref.# :93.4479-2
Client Sample ID :WAI LF05 S04-1.5
Matrix :SOIL

Qualifier/Comments

		Qualifier		Comment			
2,4,5-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chloronaphthalene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitroaniline	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Dimethylphthalate	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Acenaphthylene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,6-Dinitrotoluene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
3-Nitroaniline	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Acenaphthene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dinitrophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Nitrophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Dibenzofuran	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dinitrotoluene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Diethylphthalate	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chlorophenyl-Phenylet	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Fluorene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Nitroaniline	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4,6-Dinitro-2-Methylphe	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitrosodiphenylamine	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Bromophenyl-Phenyleth	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobenzene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Pentachlorophenol	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Phenanthrene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Anthracene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
i-n-Butylphthalate	3.41	B	mg/Kg	EPA 8270 (U)-E.1	09/12	10/19	GV
luoranthene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Pyrene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Butylbenzylphthalate	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
3,3-Dichlorobenzidine	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzo(a)Anthracene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Chrysene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Ethylhexyl)Phthal	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
di-n-Octylphthalate	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzo(b)Fluoranthene	0.210	U	mg/Kg	EPA 8270 (J)-D.1	09/12	10/19	GV
Benzo(k)Fluoranthene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzo(a)Pyrene	0.210	U	mg/Kg	EPA 8270 (J)-D.1	09/12	10/19	GV
Indeno(1,2,3-cd)Pyrene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV
Dibenz(a,h)Anthracene	0.210	U	mg/Kg	EPA 8270 (J)-D.1	09/12	10/19	GV
Benzo(g,h,i)Perylene	0.210	U	mg/Kg	EPA 8270	09/12	10/19	GV

Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA n/a			
Aluminum	1900		mg/Kg	EPA 6010	09/08	09/20	DFL
Antimony	51	U J	mg/Kg J.2	EPA 6010	09/08	09/20	DFL
Arsenic	51	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Barium	250		mg/Kg	EPA 6010	09/08	09/20	DFL
Beryllium	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Cadmium	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Calcium	2700		mg/Kg	EPA 6010	09/08	09/20	DFL
Chromium	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Cobalt	12		mg/Kg	EPA 6010	09/08	09/20	DFL

Original changes by: S.L. 2/7/94

2-10-94

Compiled: BMF 11.16.94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99
TEL: (907) 562-2
FAX: (907) 561-53

Chemlab Ref.# :93.4479-2
Client Sample ID :WAI LF05 S04-1.5
Matrix :SOIL

		Qualifier		Comment				
Copper	41		mg/Kg		EPA 6010	09/08	09/20	DFL
Iron	99000		mg/Kg		EPA 6010	09/08	09/20	DFL
Lead	37		mg/Kg		EPA 6010	09/08	09/20	DFL
Magnesium	1900		mg/Kg		EPA 6010	09/08	09/20	DFL
Manganese	1100	J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Molybdenum	26	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Nickel	25		mg/Kg		EPA 6010	09/08	09/20	DFL
Potassium	510	J	mg/Kg	C.1	EPA 6010	09/08	09/21	DFL
Selenium	510	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Silver	26	U ~~R~~	mg/Kg	~~J.1~~	EPA 6010	09/08	09/20	DFL
Sodium	84		mg/Kg		EPA 6010	09/08	09/20	DFL
Thallium	0.26	U	mg/Kg		EPA 7841	09/08	09/10	KAW
Vanadium	30		mg/Kg		EPA 6010	09/08	09/20	DFL
Zinc	150		mg/Kg		EPA 6010	09/08	09/20	DFL
TOC, Soil	25900	–	mg/Kg		PSEP Ref Lab			

3/22/94

All chngs sc 2/7/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

mlab Ref.# :93.4479-1
Client Sample ID :WAI LF05 SD02
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected : @ hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M: LEMMA, AND ROBERT T. B = THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics								
Benzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromobenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromochloromethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromodichloromethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromoform	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromomethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
n-Butylbenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
se utylbenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
te Butylbenzne	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Carbon Tetrachloride	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chlorobenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroform	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloromethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Chlorotoluene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
4-Chlorotoluene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromochloromethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
12Dibromo3Chloropropane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,2-Dibromoethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
ibromomethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,2-Dichlorobenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,3-Dichlorobenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,4-Dichlorobenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
ichlorodifluoromethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,1-Dichloroethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,2-Dichloroethane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
,1-Dichloroethene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
s-1,2-Dichloroethene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
ans1,2-Dichloroethene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Dichloropropane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
3-Dichloropropane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Dichloropropane	0.300	U	mg/Kg	EPA 8260		09/01	09/06	KV
1-Dichloropropene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	[illegible]
ylbenzene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	
achlorobutadiene	0.300	U	mg/Kg	EPA 8260		09/01	09/06	

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-1
Client Sample ID :WAI LF05 SD02
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Isopropylbenzene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p-Isopropyltoluene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Methylene Chloride	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Napthalene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
n-Propylbenzene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Styrene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1112-Tetrachloroethane	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1122-Tetrachloroethane	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Tetrachloroethene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Toluene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichlorobenzene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trichlorobenzene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,1-Trichloroethane	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,2-Trichloroethane	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichloroethene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichlorofluoromethane	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichloropropane	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trimethylbenzene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,3,5-Trimethylbenzene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Vinyl Chloride	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p+m-Xylene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
o-Xylene	0.300	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Semivolatile Organics				EPA 8270			
Phenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethyl)ether	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chlorophenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,3-Dichlorobenzene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,4-Dichlorobenzene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzyl Alcohol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2-Dichlorobenzene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylphenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroisopropyl)e	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Methylphenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitroso-di-n-Propylam	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachloroethane	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Nitrobenzene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Isophorone	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitrophenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dimethylphenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzoic Acid	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethoxy)Meth	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dichlorophenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2,4-Trichlorobenzene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Naphthalene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloroaniline	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobutadiene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloro-3-Methylphenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylnaphthalene	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorocyclopentadie	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4,6-Trichlorophenol	3.20	U	mg/Kg	EPA 8270	09/12	10/19	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-1
Client Sample ID :WAI LF05 SD02
Matrix :SOIL

Qualifier/Comments

		Qualifier		Comment		
2,4,5-Trichlorophenol	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
2-Chloronaphthalene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
2-Nitroaniline	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Dimethylphthalate	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Acenaphthylene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
2,6-Dinitrotoluene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
3-Nitroaniline	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Acenaphthene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
2,4-Dinitrophenol	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
4-Nitrophenol	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Dibenzofuran	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
2,4-Dinitrotoluene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Diethylphthalate	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
4-Chlorophenyl-Phenylet	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Fluorene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
4-Nitroaniline	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
4,6-Dinitro-2-Methylphe	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
n-Nitrosodiphenylamine	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
4-Bromophenyl-Phenyleth	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Hexachlorobenzene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Pentachlorophenol	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Phenanthrene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Anthracene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Di-n-Butylphthalate	37.6	B	mg/Kg	EPA 8270 (J)-E.1	09/12 10/19	GV
Fluoranthene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Pyrene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Butylbenzylphthalate	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
3,3-Dichlorobenzidine	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Benzo(a)Anthracene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Chrysene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
bis(2-Ethylhexyl)Phthal	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
di-n-Octylphthalate	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Benzo(b)Fluoranthene	3.20	U	mg/Kg	EPA 8270 (J)-D.1	09/12 10/19	GV
Benzo(k)Fluoranthene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Benzo(a)Pyrene	3.20	U	mg/Kg	EPA 8270 (J)-D.1	09/12 10/19	GV
Indeno(1,2,3-cd)Pyrene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Dibenz(a,h)Anthracene	3.20	U	mg/Kg	EPA 8270 (J)-D.1	09/12 10/19	GV
Benzo(g,h,i)Perylene	3.20	U	mg/Kg	EPA 8270	09/12 10/19	GV
Sample Preparation	---			EPA 3050 Digest		
Total Metals Analysis	---			-		
ICP Screen, ICF				EPA n/a		
Aluminum	15000		mg/Kg	EPA 6010	09/08 09/20	DFL
Antimony	150	U J	mg/Kg J.2	EPA 6010	09/08 09/20	DFL
Arsenic	150	U	mg/Kg	EPA 6010	09/08 09/20	DFL
Barium	420		mg/Kg	EPA 6010	09/08 09/20	DFL
Beryllium	7.2	U	mg/Kg	EPA 6010	09/08 09/20	DFL
Cadmium	72		mg/Kg	EPA 6010	09/08 09/20	DFL
Calcium	4950		mg/Kg	EPA 6010	09/08 09/20	DFL
Chromium	26		mg/Kg	EPA 6010	09/08 09/20	DFL
Cobalt	15	U	mg/Kg	EPA 6010	09/08 09/20	DFL

Original changes: S.L. 2/7/94

AP 2-10-94

Compiled: SML 11-16-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-1
Client Sample ID :WAI LF05 SD02
Matrix :SOIL

		Qualfie		Correct				
Copper	14		mg/Kg		EPA 6010	09/08	09/20	DFL
Iron	25000		mg/Kg		EPA 6010	09/08	09/20	DFL
Lead	15	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Magnesium	3100		mg/Kg		EPA 6010	09/08	09/20	DFL
Manganese	67	J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Molybdenum	7.2	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Nickel	15		mg/Kg		EPA 6010	09/08	09/20	DFL
Potassium	1500	J	mg/Kg	C.1	EPA 6010	09/08	09/21	DFL
Selenium	150	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Silver	72	U R	mg/Kg	J.1	EPA 6010	09/08	09/20	DFL
Sodium	1500		mg/Kg		EPA 6010	09/08	09/20	DFL
Thallium	0.82	U	mg/Kg		EPA 7841	09/08	09/10	KAW
Vanadium	43		mg/Kg		EPA 6010	09/08	09/20	DFL
Zinc	30		mg/Kg		EPA 6010	09/08	09/20	DFL
TOC, Soil	271000		mg/Kg		PSEP Ref Lab			

3/31/94

All changes 2/7/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4478-1
Client Sample ID :WAI LF05 SW01
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70337
Report Completed :09/29/93
Collected :08/29/93 @ 15:25 hr
Received :08/31/93 @ 12:00 hr
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.M., P.E.M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Bromoform	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Bromomethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Chloroethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Chloroform	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Chloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KW

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4478-1
Client Sample ID :WAI LF05 SW01
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Napthalene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Styrene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Toluene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
o-Xylene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWI
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Isophorone	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4478-1
Client Sample ID :WAI LF05 SW01
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluorene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Phenanthrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Chrysene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	2.1		mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.23		mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	24		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Iron	23		mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4478-1
Client Sample ID :WAI LF05 SW01
Matrix :WATER

			Qualifier		Comment					
Magnesium	26			mg/L		EPA 6010		09/08	09/10	DLG
Manganese	0.15			mg/L		EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Nickel	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Potassium	9.5			mg/L		EPA 6010		09/08	09/10	DLG
Selenium	0.10	U		mg/L		EPA 6010		09/08	09/10	DLG
Silver	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Sodium	110			mg/L		EPA 6010		09/08	09/10	DLG
Thallium	0.005	U		mg/L		EPA 7841		09/08	09/08	BMW
Vanadium	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Zinc	0.23		J	mg/L	I.2	EPA 6010		09/08	09/10	DLG
Dissolved Metals Analys	---					-				
ICP Screen, ICP						EPA	n/a			
Aluminum	2.2			mg/L		EPA 6010		09/08	09/10	DLG
Antimony	0.10	U		mg/L		EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U		mg/L		EPA 6010		09/08	09/10	DLG
Barium	0.23			mg/L		EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Calcium	23			mg/L		EPA 6010		09/08	09/10	DLG
Chromium	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U		mg/L		EPA 6010		09/08	09/10	[illegible]
Copper	0.050	U		mg/L		EPA 6010		09/08	09/10	[illegible]
Iron	21			mg/L		EPA 6010		09/08	09/10	DLG
Lead	0.10	U		mg/L		EPA 6010		09/08	09/10	DLG
Magnesium	27			mg/L		EPA 6010		09/08	09/10	DLG
Manganese	0.13			mg/L		EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Nickel	0.050	U		mg/L		EPA 6010		09/08	09/10	DLG
Potassium	11			mg/L		EPA 6010		09/08	09/10	DLG
Selenium	0.10	U		mg/L		EPA 6010		09/08	09/10	DLG
Silver	0.050	U	J	mg/L	I.1	EPA 6010		09/08	09/10	DLG
Sodium	130			mg/L		EPA 6010		09/08	09/10	DLG
Thallium	0.005	U		mg/L		EPA 7841		09/08	09/08	BMW
Vanadium	0.050	U		mg/L		EPA 6010		09/08	09/10	DFL
Zinc	0.16			mg/L		EPA 6010		09/08	09/10	DFL
TOC, Nonpurgable						EPA 9060	n/a			
...TOC Range	221-241			mg/L		EPA 9060			09/14	CMR
...TOC Concentration	231			mg/L		EPA 9060			09/14	CMR
Residue, Non-Filterable	105			mg/L		EPA 160.2		09/03	09/03	GPP
Residue,Filterable(TDS)	1060	U	J	mg/L	A.1	EPA 160.1	500	09/13	09/14	RJK

2/8/94

All chngs ... 2/10/94

Compiled: SMF 4.16.94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4478-2 Ø
Client Sample ID :WAI LF05 SW~~2~~ gmf 12.16.94
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70337
Report Completed :09/29/93
Collected :08/29/93 @ 15:45 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.M., P.E.M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,2-Dichloroethane	0.0062		mg/L	EPA 8260		09/03	09/03	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/03	09/03	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4478-2
Client Sample ID :WAI LF05 ~~SW2~~ SW Ø2 SMF 12-16-94
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/03	09/03	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.012	U	mg/L	EPA 8270	09/04	09/27	[illegible]
bis(2-Chloroethyl)ether	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chlorophenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
1,3-Dichlorobenzene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
1,4-Dichlorobenzene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzyl Alcohol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2-Dichlorobenzene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylphenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroisopropyl)e	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Methylphenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
n-Nitroso-di-n-Propylam	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachloroethane	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Nitrobenzene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Isophorone	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Nitrophenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dimethylphenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzoic Acid	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethoxy)Meth	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dichlorophenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2,4-Trichlorobenzene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Naphthalene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloroaniline	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorobutadiene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloro-3-Methylphenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylnaphthalene	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorocyclopentadie	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,6-Trichlorophenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,5-Trichlorophenol	0.012	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chloronaphthalene	0.012	U	mg/L	EPA 8270	09/04	09/27	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4478-2
Client Sample ID :WAI LF05 ~~SW2~~ 5WØ2
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Dimethylphthalate	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthylene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
2,6-Dinitrotoluene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
3-Nitroaniline	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrophenol	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitrophenol	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenzofuran	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrotoluene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Diethylphthalate	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Chlorophenyl-Phenylet	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluorene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitroaniline	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
4,6-Dinitro-2-Methylphe	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
n-Nitrosodiphenylamine	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Bromophenyl-Phenyleth	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Hexachlorobenzene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Pentachlorophenol	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Phenanthrene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Anthracene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Butylphthalate	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluoranthene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Pyrene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Butylbenzylphthalate	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
3,3-Dichlorobenzidine	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Anthracene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Chrysene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
bis(2-Ethylhexyl)Phthal	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Octylphthalate	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(b)Fluoranthene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(k)Fluoranthene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Pyrene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Indeno(1,2,3-cd)Pyrene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenz(a,h)Anthracene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(g,h,i)Perylene	0.012	U	mg/L	EPA 8270		09/04	09/27	MTT
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.18		mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.053		mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	6.0		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Iron	16		mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4478-2
Client Sample ID :WAI LF05 ~~SW2~~ SWØ2
Matrix :WATER

8mf 12.16.94

Magnesium	6.0		mg/L	EPA 6010		09/08	09/10	DLG
Manganese	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Nickel	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Potassium	5.0	U	mg/L	EPA 6010		09/08	09/10	DLG
Selenium	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Silver	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Sodium	18		mg/L	EPA 6010		09/08	09/10	DLG
Thallium	0.005	U	mg/L	EPA 7841		09/08	09/08	BMW
Vanadium	0.050	U	mg/L	EPA 6010		09/09	09/10	DLG
Zinc	0.050	U	mg/L	EPA 6010		09/09	09/10	DLG
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	5.2		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L	EPA 6010		09/08	09/10	[illegible]
Copper	0.050	U	mg/L	EPA 6010		09/08	09/10	[illegible]
Iron	0.48		mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Magnesium	5.0		mg/L	EPA 6010		09/08	09/10	DLG
Manganese	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Nickel	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Potassium	5.0	U	mg/L	EPA 6010		09/08	09/10	DLG
Selenium	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Silver	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Sodium	10		mg/L	EPA 6010		09/08	09/10	DLG
Thallium	0.005	U	mg/L	EPA 7841		09/08	09/08	BMW
Vanadium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Zinc	0.050	U	mg/L	EPA 6010		09/24	09/28	DFL
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	64.0-69.0		mg/L	EPA 9060			09/14	CMR
...TOC Concentration	64.6		mg/L	EPA 9060			09/14	CMR
Residue, Non-Filterable	68		mg/L	EPA 160.2		09/07	09/07	GPP
Residue,Filterable(TDS)	90		mg/L	EPA 160.1	500		09/14	RJK

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	WAI-LF05-S01-1	WAI-LF05-S02-1	WAI-LF05-S03-1	WAI-LF05-S04-1.5
F&BI Number	1222	1224	1226	1228
Sample Type	soil	soil	soil	soil
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight	44	42	70	95
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
Leaded Gas				
JP-4	<110	<120	<70	<60
Lube Oil	<220	<240	<140	<120
Diesel	<110	<120	<70	<60
Spike Level				
Unknown Semi-volatile				
Pentacosane	109	111	85	94
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
PCB 1221	<0.1	<0.1	<0.1	<0.1
PCB 1232	<0.1	<0.1	<0.1	<0.1
PCB 1016	<0.1	<0.1	<0.1	<0.1
PCB 1242	<0.1	<0.1	<0.1	<0.1
PCB 1248	<0.1	<0.1	<0.1	<0.1
PCB 1254	<0.1	<0.1	<0.1	<0.1
PCB 1260	<0.1	<0.1	<0.1	<0.1
Spike Level				
Dibutyl Chlorendate	112	101	124	97
Sequence Date				#6-09/03/93
alpha-BHC				<0.01 J
beta-BHC				<0.01
gamma-BHC				<0.01
delta-BHC				<0.01
Heptachlor				<0.01
Aldrin				<0.01
Heptachlor Epoxide				<0.01
Endosulfan I				<0.01
DDE				<0.01
Dieldrin				<0.01
Endrin				<0.01
Endosulfan II				<0.01
DDD				<0.01
Endrin Aldehyde				<0.01
DDT				<0.01
Endosulfan Sulfate				<0.01
Endrin Ketone				<0.01
Methoxy Chlor				~~<0.1~~ <0.5 J
Chlordane				<0.5 J
Dibutyl Chlorendate				95
Spike Level				
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93
CCl4	<0.04	<0.04	<0.02	<0.02
TCA	<0.04	<0.04	<0.02	<0.02
Benzene	<0.04	<0.04	<0.02	<0.02
TCE	<0.04	<0.04	<0.02	<0.02
Toluene	<0.04	<0.04	<0.02	0.09 J
PCE	<0.04	<0.04	<0.02	<0.02
Ethylbenzene	<0.04	<0.04	<0.02	1.5 J
Xylenes	<0.08	<0.08	<0.04	8 J
Gasoline	~~<2~~ <4	~~<2~~ <4	~~<1~~ <2 J	~~80~~ 200 J
Spike level				
BFB	96	69	62	110

ICF ID	WAI-LF05-S04-1.5	WAI-LF05-S04-1.5	WAI-LF05-S04-1.5	WAI-LF05-S07-1
F&BI Number	1228 dup	1228 ms	1228 msd	1230
Sample Type	soil	soil	soil	soil
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight				73
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
Leaded Gas				
JP-4	<50			<70
Lube Oil	<100			<140
Diesel	~~100~~ <60J	111	112	<100
Spike Level		500	500	
Unknown Semi-volatile				20 biological
Pentacosane	80	111	118	110
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
PCB 1221	<0.1			<0.1
PCB 1232	<0.1			<0.1
PCB 1016	<0.1			<0.1
PCB 1242	<0.1			<0.1
PCB 1248	<0.1			<0.1
PCB 1254	<0.1	112	114	<0.1
PCB 1260	<0.1			<0.1
Spike Level		5	5	
Dibutyl Chlorendate	108	114	119	118
Sequence Date	#6-09/03/93			
alpha-BHC	<0.01			
beta-BHC	<0.01			
gamma-BHC	<0.01			
delta-BHC	<0.01			
Heptachlor	<0.01			
Aldrin	<0.01			
Heptachlor Epoxide	<0.01			
Endosulfan I	<0.01			
DDE	<0.01			
Dieldrin	<0.01			
Endrin	<0.01			
Endosulfan II	<0.01			
DDD	<0.01			
Endrin Aldehyde	<0.01			
DDT	<0.01			
Endosulfan Sulfate	<0.01			
Endrin Ketone	<0.01			
Methoxy Chlor	<0.1			
Chlordane	<0.5			
Dibutyl Chlorendate	96			
Spike Level				
Vol Sequence	#3&4-09/02/93			#3&4-09/02/93
CCl4	<0.02			<0.02
TCA	<0.02			<0.02
Benzene	<0.02			<0.02J
TCE	<0.02			<0.02
Toluene	0.09			<0.02
PCE	<0.02			<0.02
Ethylbenzene	0.9			<0.02
Xylenes	4.9			<0.04
Gasoline	<2			~~<~~ <2J
Spike level				
BFB	96			103

ICF ID	WAI-LF05-SD01	WAI-LF05-SD02	WAI-LF05-SW01	WAI-LF05-SW01
F&BI Number	1232	1234	1255	1256
Sample Type	soil	soil	water	water
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight	23	38		
Sequence Date	#6-08/31/93	#6-08/31/93		#5-09/01/93
Leaded Gas				
JP-4	<210	<130		<200
Lube Oil	<430	<260		<2000
Diesel	<490	<130		~~<200~~ <1000
Spike Level				
Unknown Semi-volatile	20 biological			
Pentacosane	120	109		76
Sequence Date	#6-08/31/93	#6-08/31/93	#5-09/01/93	
PCB 1221	~~≤0.1~~ <0.4	~~≤0.1~~ <0.3	<2	
PCB 1232	~~≤0.1~~	~~≤0.1~~	<2	
PCB 1016	~~≤0.1~~	~~≤0.1~~	<2	
PCB 1242	~~≤0.1~~	~~≤0.1~~	<2	
PCB 1248	~~≤0.1~~	~~≤0.1~~	<2	
PCB 1254	~~≤0.1~~	~~≤0.1~~	<2	
PCB 1260	~~≤0.1~~	~~≤0.1~~	<2	
Spike Level				
Dibutyl Chlorendate	113	103	85	
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93		
CCl4	<0.02	<0.02		
TCA	<0.02	<0.02		
Benzene	<0.09 J	<0.05 J		
TCE	<0.02	<0.02		
Toluene	<0.09	<0.05		
PCE	<0.02	<0.02		
Ethylbenzene	<0.09	<0.05		
Xylenes	<0.18	<0.1		
Gasoline	~~≤4~~ <8 J	~~≤3~~ <6 J		
Spike level				
BFB	107	89		

Smk 5.3.95

ICF ID	WAI-LF05-SW01	WAI-LF05-SW02	WAI-LF05-SW02
F&BI Number	1258	1250	1252
Sample Type	water	water	water
Date Received	8/29/93	8/29/93	8/29/93
% Dry Weight			
Sequence Date		#5-09/01/93	
Leaded Gas			
JP-4		<200	
Lube Oil		<2000	
Diesel		~~<200~~ <1000	
Spike Level			
Unknown Semi-volatile			
Pentacosane		98	
Sequence Date		#5-09/01/93	
PCB 1221		<2	
PCB 1232		<2	
PCB 1016		<2	
PCB 1242		<2	
PCB 1248		<2	
PCB 1254		<2	
PCB 1260		<2	
Spike Level			
Dibutyl Chlorendate		91	
Sequence Date			
alpha-BHC			
beta-BHC			
gamma-BHC			
delta-BHC			
Heptachlor			
Aldrin			
Heptachlor Epoxide			
Endosulfan I			
DDE			
Dieldrin			
Endrin			
Endosulfan II			
DDD			
Endrin Aldehyde			
DDT			
Endosulfan Sulfate			
Endrin Ketone			
Methoxy Chlor			
Chlordane			
Dibutyl Chlorendate			
Spike Level			
Vol Sequence	#3&4-09/02/93		#3&4-09/02/93
CCl4	<10		<10
TCA	<10		<10
Benzene	<1		<1
TCE	<10		<10
Toluene	<1		<1
PCE	<10		<10
Ethylbenzene	<1		<1
Xylenes	<2		<2
Gasoline	~~<50~~ <100 J		~~<50~~ <100 J
Spike level			
BFB	85		115

SNL 5.3.95

ANALYTICAL DATA SHEETS FOR THE GARAGE (SS07)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref:# :93.4484-3
Client Sample ID :WAI SS07 S01
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70331
Report Completed :11/02/93
Collected :08/30/93 @ 11:45 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Vomestead

Sample Remarks: SAMPLE COLLECTED BY: M LEMMON, J. M. 8270: HOLDING TIME WAS EXCEEDED, SAMPLE NOT ANALIZED AS PER CLIENT.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromodichloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromoform	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
n-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
sec-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
tert-Butylbenzne	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Carbon Tetrachloride	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroform	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
4-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
12Dibromo3Chloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dibromoethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,4-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dichlorodifluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
cis-1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
trans1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloropropene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Ethylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Hexachlorobutadiene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Isopropylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-3
Client Sample ID :WAI SS07 S01
Matrix :SOIL

p-Isopropyltoluene	0.394	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Methylene Chloride	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Napthalene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
n-Propylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Styrene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1112-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1122-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Tetrachloroethene	10.4	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Toluene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,3-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,4-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1,1-Trichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1,2-Trichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Trichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Trichlorofluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,3-Trichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,4-Trimethylbenzene	0.376	D	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3,5-Trimethylbenzene	1.75	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Vinyl Chloride	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
p+m-Xylene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
o-Xylene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	3600	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Antimony	53	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Arsenic	53	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Barium	160		mg/Kg	EPA 6010		09/09	09/23	DFL
Beryllium	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Cadmium	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Calcium	5200		mg/Kg	EPA 6010		09/09	09/23	DFL
Chromium	30		mg/Kg	EPA 6010		09/09	09/23	DFL
Cobalt	8.6		mg/Kg	EPA 6010		09/09	09/23	DFL
Copper	39		mg/Kg	EPA 6010		09/09	09/23	DFL
Iron	53000		mg/Kg	EPA 6010		09/09	09/23	DFL
Lead	130		mg/Kg	EPA 6010		09/09	09/23	DFL
Magnesium	3300		mg/Kg	EPA 6010		09/09	09/23	DFL
Manganese	660		mg/Kg	EPA 6010		09/09	09/23	DFL
Molybdenum	2.7	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Nickel	18		mg/Kg	EPA 6010		09/09	09/23	DFL
Potassium	425		mg/Kg	EPA 6010		09/09	09/24	DFL
Selenium	53	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Silver	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Sodium	100		mg/Kg	EPA 6010		09/09	09/24	DFL
Thallium	0.27	U	mg/Kg	EPA 7841		09/09	09/10	KAW
Vanadium	21		mg/Kg	EPA 6010		09/09	09/23	DFL
Zinc	240		mg/Kg	EPA 6010		09/09	09/23	DFL

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1929

REPORT of ANALYSIS

Chemlab Ref.# :93.4484-4
Client Sample ID :WAI SS07 S03
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70331
Report Completed :11/02/93
Collected :08/30/93 @ 11:45 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Vonesteel

Sample Remarks: SAMPLE COLLECTED BY: M LEMMON, J. M. 8270: HOLDING TIME WAS EXCEEDED, SAMPLE NOT ANALIZED AS PER CLIENT.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromodichloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromoform	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
n-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
sec-Butylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
tert-Butylbenzne	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Carbon Tetrachloride	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroform	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
4-Chlorotoluene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromochloromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
12Dibromo3Chloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dibromoethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromomethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,4-Dichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dichlorodifluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
cis-1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
trans1,2-Dichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2,2-Dichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloropropene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Ethylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Hexachlorobutadiene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Isopropylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-4
Client Sample ID :WAI SS07 S03
Matrix :SOIL

p-Isopropyltoluene	0.502	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Methylene Chloride	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Napthalene	0.393	D	mg/Kg	EPA 8260		09/01	09/15	KWM
n-Propylbenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Styrene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1112-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1122-Tetrachloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Tetrachloroethene	11.5	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Toluene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,3-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,4-Trichlorobenzene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1,1-Trichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1,2-Trichloroethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Trichloroethene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Trichlorofluoromethane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,3-Trichloropropane	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,4-Trimethylbenzene	0.714	D	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3,5-Trimethylbenzene	5.36	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Vinyl Chloride	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
p+m-Xylene	0.200	U	mg/Kg	EPA 8260		09/01	09/15	KWM
o-Xylene	0.354	D	mg/Kg	EPA 8260		09/01	09/15	KWM
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	2800		mg/Kg	EPA 6010		09/09	09/23	DFL
Antimony	54	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Arsenic	54	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Barium	240		mg/Kg	EPA 6010		09/09	09/23	DFL
Beryllium	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Cadmium	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Calcium	6100		mg/Kg	EPA 6010		09/09	09/23	DFL
Chromium	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Cobalt	5.4	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Copper	13		mg/Kg	EPA 6010		09/09	09/23	DFL
Iron	36000		mg/Kg	EPA 6010		09/09	09/23	DFL
Lead	74		mg/Kg	EPA 6010		09/09	09/23	DFL
Magnesium	2960		mg/Kg	EPA 6010		09/09	09/23	DFL
Manganese	370		mg/Kg	EPA 6010		09/09	09/23	DFL
Molybdenum	2.7	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Nickel	14		mg/Kg	EPA 6010		09/09	09/23	DFL
Potassium	270	U	mg/Kg	EPA 6010		09/09	09/24	DFL
Selenium	54	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Silver	27	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Sodium	95		mg/Kg	EPA 6010		09/09	09/24	DFL
Thallium	0.27	U	mg/Kg	EPA 7841		09/09	09/10	KAW
Vanadium	16		mg/Kg	EPA 6010		09/09	09/23	DFL
Zinc	89		mg/Kg	EPA 6010		09/09	09/23	DFL

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-5
Client Sample ID :WAI SS07 SD01
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70331
Report Completed :11/02/93
Collected :08/30/93 @ 12:15 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M LEMMON, J. M. 8270: HOLDING TIME WAS EXCEEDED, SAMPLE NOT ANALIZED AS PER CLIENT.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromochloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromoform	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromomethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
n-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
sec-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
tert-Butylbenzne	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Carbon Tetrachloride	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroform	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
4-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
12Dibromo3Chloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dibromoethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromomethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,4-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dichlorodifluoromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
cis-1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
trans1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloropropene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Hexachlorobutadiene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Isopropylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX. (907) 561-5301

Chemlab Ref.# :93.4484-5
Client Sample ID :WAI SS07 SD01
Matrix :SOIL

		Qualifier	Comment					
p-Isopropyltoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Methylene Chloride	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Napthalene	0.034		mg/Kg	EPA 8260		09/01	09/15	KWM
n-Propylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Styrene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1112-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Tetrachloroethene	0.059		mg/Kg	EPA 8260		09/01	09/15	KWM
Toluene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,3-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,4-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1,1-Trichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1,2-Trichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Trichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,3-Trichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2,4-Trimethylbenzene	0.040		mg/Kg	EPA 8260		09/01	09/15	KWM
1,3,5-Trimethylbenzene	0.024		mg/Kg	EPA 8260		09/01	09/15	KWM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
p+m-Xylene	0.022		mg/Kg	EPA 8260		09/01	09/15	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICP				EPA	n/a			
Aluminum	1980		mg/Kg	EPA 6010		09/09	09/23	DFL
Antimony	50	U R	mg/Kg J.1	EPA 6010		09/09	09/23	DFL
Arsenic	50	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Barium	220		mg/Kg	EPA 6010		09/09	09/23	DFL
Beryllium	25	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Cadmium	25	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Calcium	3700		mg/Kg	EPA 6010		09/09	09/23	DFL
Chromium	25	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Cobalt	13.5	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Copper	17		mg/Kg	EPA 6010		09/09	09/23	DFL
Iron	114000		mg/Kg	EPA 6010		09/09	09/23	DFL
Lead	50	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Magnesium	2500		mg/Kg	EPA 6010		09/09	09/23	DFL
Manganese	1250		mg/Kg	EPA 6010		09/09	09/23	DFL
Molybdenum	25	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Nickel	29		mg/Kg	EPA 6010		09/09	09/23	DFL
Potassium	290		mg/Kg	EPA 6010		09/09	09/24	DFL
Selenium	500	U	mg/Kg	EPA 6010		09/09	09/23	DFL
Silver	25	U R	mg/Kg J.1	EPA 6010		09/09	09/23	DFL
Sodium	100		mg/Kg	EPA 6010		09/09	09/24	DFL
Thallium	0.26	U	mg/Kg	EPA 7841		09/09	09/10	KAW
Vanadium	34		mg/Kg	EPA 6010		09/09	09/23	DFL
Zinc	160		mg/Kg	EPA 6010		09/09	09/23	DFL

S.L 2/10/94

All chngs

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-2
Client Sample ID :WAI SS07 2SD06
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70794
Report Completed :11/04/93
Collected :09/07/93 @ 16:35 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG. EPH PATTERN NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	73.4		%	SM17 2540G			09/10	EAL
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015M		09/10	09/14	WLS
Hydrocarbons EPH	47.4		mg/Kg	3510/3550/8100M		09/21	09/22	DRS

* See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-1
Client Sample ID :WAI SS07 SW01
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70331
Report Completed :11/02/93
Collected :08/30/93 @ 12:25 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: M LEMMON, J. M.

Qualifier/Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260 (J) - A.1		09/15	09/15	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloroethane	0.0018		mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]

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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-1
Client Sample ID :WAI SS07 SW01
Matrix :WATER

Qualifier/Comments

Methylene Chloride	0.0010	U	mg/L	EPA 8260 (J)-A.1	09/15	09/15	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroethyl)ether	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2-Chlorophenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
1,3-Dichlorobenzene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
1,4-Dichlorobenzene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Benzyl Alcohol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
1,2-Dichlorobenzene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2-Methylphenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroisopropyl)e	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
4-Methylphenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
n-Nitroso-di-n-Propylam	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachloroethane	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Nitrobenzene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Isophorone	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2-Nitrophenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dimethylphenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Benzoic Acid	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroethoxy)Meth	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dichlorophenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
1,2,4-Trichlorobenzene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Naphthalene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chloroaniline	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorobutadiene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chloro-3-Methylphenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2-Methylnaphthalene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorocyclopentadie	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2,4,6-Trichlorophenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2,4,5-Trichlorophenol	0.011	U	mg/L	EPA 8270	09/06	10/06	GV
2-Chloronaphthalene	0.011	U	mg/L	EPA 8270	09/06	10/06	GV

CA
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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-1
Client Sample ID :WAI SS07 SW01
Matrix :WATER

2-Nitroaniline	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Dimethylphthalate	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Acenaphthylene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
2,6-Dinitrotoluene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
3-Nitroaniline	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Acenaphthene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dinitrophenol	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
4-Nitrophenol	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Dibenzofuran	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
2,4-Dinitrotoluene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Diethylphthalate	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
4-Chlorophenyl-Phenylet	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Fluorene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
4-Nitroaniline	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
4,6-Dinitro-2-Methylphe	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
n-Nitrosodiphenylamine	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
4-Bromophenyl-Phenyleth	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Hexachlorobenzene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Pentachlorophenol	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Phenanthrene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Anthracene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
di-n-Butylphthalate	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Fluoranthene	0.011	U	mg/L	EPA 8270		09/06	10/06	[illegible]
Pyrene	0.011	U	mg/L	EPA 8270		09/06	10/06	[illegible]
Butylbenzylphthalate	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
3,3-Dichlorobenzidine	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(a)Anthracene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Chrysene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
bis(2-Ethylhexyl)Phthal	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
di-n-Octylphthalate	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(b)Fluoranthene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(k)Fluoranthene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(a)Pyrene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Indeno(1,2,3-cd)Pyrene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Dibenz(a,h)Anthracene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Benzo(g,h,i)Perylene	0.011	U	mg/L	EPA 8270		09/06	10/06	GV
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Barium	0.22		mg/L	EPA 6010		09/10	09/14	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Calcium	30		mg/L	EPA 6010		09/10	09/14	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Copper	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Iron	2.9		mg/L	EPA 6010		09/10	09/14	DFL
Lead	0.10	U	mg/L	EPA 6010		09/10	09/14	D[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-1
Client Sample ID :WAI SS07 SW01
Matrix :WATER

Magnesium	41		mg/L	EPA 6010		09/10	09/14	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/10	09/14	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/10	09/21	DFL
Silver	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Sodium	49		mg/L	EPA 6010		09/10	09/21	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/09	09/10	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Zinc	0.44	J	mg/L G.1	EPA 6010		09/10	09/14	DFL
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Barium	0.18		mg/L	EPA 6010		09/10	09/14	DFL
Beryllium	0.050		mg/L	EPA 6010		09/10	09/14	DFL
Cadmium	0.050		mg/L	EPA 6010		09/10	09/14	DFL
Calcium	35		mg/L	EPA 6010		09/10	09/14	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Copper	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Iron	0.30		mg/L	EPA 6010		09/10	09/14	DFL
Lead	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Magnesium	60		mg/L	EPA 6010		09/10	09/14	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/10	09/14	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/10	09/21	DFL
Silver	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Sodium	51		mg/L	EPA 6010		09/10	09/21	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/09	09/10	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL

All clays s.c 2/10/94

===

* See Special Instructions Above
** See Sample Remarks Above
U Undetected, Reported value is the practical quantification limit.
Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-2
Client Sample ID :WAI SS07 SW03
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70331
Report Completed :11/02/93
Collected :08/30/93 @ 12:15 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Umestead

Sample Remarks: SAMPLE COLLECTED BY: M LEMMON, J. M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4484-2
Client Sample ID :WAI SS07 SW03
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Semivolatile Organics							
Phenol				EPA 8270			
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Isophorone	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Naphthalene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4484-2
Client Sample ID :WAI SS07 SW03
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Dimethylphthalate	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Acenaphthylene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
3-Nitroaniline	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Acenaphthene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Nitrophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Dibenzofuran	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Diethylphthalate	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Fluorene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Nitroaniline	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Hexachlorobenzene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Pentachlorophenol	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Phenanthrene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Anthracene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Fluoranthene	0.010	U	mg/L	EPA 8270	09/06	10/06	[illegible]
Pyrene	0.010	U	mg/L	EPA 8270	09/06	10/06	[illegible]
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Chrysene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
bis(2-Ethylhexyl)Phthal	0.016		mg/L	EPA 8270	09/06	10/06	GV
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270	09/06	10/06	GV
Total Metals Analysis	---			-			
ICP Screen, ICP				EPA n/a			
Aluminum	0.10	U	mg/L	EPA 6010	09/10	09/14	DFL
Antimony	0.10	U	mg/L	EPA 6010	09/10	09/14	DFL
Arsenic	0.10	U	mg/L	EPA 6010	09/10	09/14	DFL
Barium	0.24		mg/L	EPA 6010	09/10	09/14	DFL
Beryllium	0.050	U	mg/L	EPA 6010	09/10	09/14	DFL
Cadmium	0.050	U	mg/L	EPA 6010	09/10	09/14	DFL
Calcium	37		mg/L	EPA 6010	09/10	09/14	DFL
Chromium	0.050	U	mg/L	EPA 6010	09/10	09/14	DFL
Cobalt	0.10	U	mg/L	EPA 6010	09/10	09/14	DFL
Copper	0.050	U	mg/L	EPA 6010	09/10	09/14	DFL
Iron	1.1		mg/L	EPA 6010	09/10	09/14	DFL
Lead	0.10	U	mg/L	EPA 6010	09/10	09/14	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4484-2
Client Sample ID :WAI SS07 SW03
Matrix :WATER

Magnesium	62		mg/L	EPA 6010		09/10	09/14	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/10	09/21	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Silver	0.050	ØU	mg/L	EPA 6010		09/10	09/14	DFL
Sodium	51		mg/L	EPA 6010		09/10	09/21	DFL
- Thallium	0.0050	U	mg/L	EPA 7841		09/09	09/10	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Barium	0.20		mg/L	EPA 6010		09/10	09/14	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Calcium	29		mg/L	EPA 6010		09/10	09/14	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Copper	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Iron	0.13		mg/L	EPA 6010		09/10	09/14	DFL
Lead	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Magnesium	41		mg/L	EPA 6010		09/10	09/14	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/10	09/21	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/10	09/14	DFL
Silver	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Sodium	48		mg/L	EPA 6010		09/10	09/21	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/09	09/10	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/10	09/14	DFL

6 12.10.96

* See Special Instructions Above
* See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

Smp 5.3.95

ICF ID	WAI-SS07-S01	WAI-SS07-S0~~3~~ 2	WAI-SS07-S03
F&BI Number	1458	1460	1462
Sample Type	soil	soil	soil
Date Received	8/30/93	8/30/93	8/30/93
% Dry Weight	83	94	92
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93
Leaded Gas			
JP-4	<60	<50	<50
Lube Oil	1200	530	2400
Diesel	6500 J	570 J	8300 J
Spike Level			
Unknown Semi-volatile			
Pentacosane	120	100	118
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93
PCB 1221	~~<1~~ <2	~~<0.1~~ <2	~~<0.1~~ <2
PCB 1232	~~<1~~	~~<0.1~~	~~<0.1~~
PCB 1016	~~<1~~	~~<0.1~~	~~<0.1~~
PCB 1242	~~<1~~	~~<0.1~~	~~<0.1~~
PCB 1248	~~<1~~	~~<0.1~~	~~<0.1~~
PCB 1254	~~<1~~	~~<1.3~~	~~<1.0~~
PCB 1260	~~<1~~	~~<0.1~~	~~<0.1~~
Spike Level			
Dibutyl Chlorendate	116	119	150
Sequence Date	#5-09/01/93		
alpha-BHC	<0.01 J		
beta-BHC	<0.01		
gamma-BHC	<0.01		
delta-BHC	<0.01		
Heptachlor	<0.01		
Aldrin	<0.01		
Heptachlor Epoxide	<0.01		
Endosulfan I	<0.01		
DDE	<0.01		
Dieldrin	<0.01		
Endrin	<0.01		
Endosulfan II	<0.01		
DDD	<0.01		
Endrin Aldehyde	~~0.03~~ <0.1 J		
DDT	~~0.10~~ <0.1 J		
Endosulfan Sulfate	<0.1 J		
Endrin Ketone	<0.1 J		
Methoxy Chlor	~~<0.1~~ <0.5 J		
Chlordane	<0.5 J		
Dibutyl Chlorendate	104		
Spike Level			
Vol Sequence	#3&4-09/02/93, #3&4-09/04/93	#3&4-09/02/93	#3&4-09/02/93
CCl4	<0.02	<0.02	<0.02
TCA	<0.02	<0.02	<0.02
Benzene	<0.2 J	<0.2 J	<0.2
TCE	<0.02	<0.02	<0.02
Toluene	<0.2 J	<0.2 J	<0.2
PCE	~~7~~ 10	2	7
Ethylbenzene	~~2~~ 4 NJ	<0.2 J	~~<0.2~~ 0.7 NJ
Xylenes	~~11~~ 15 NJ	~~<0.4~~ 1.2 NJ	~~<0.4~~ 1.2 NJ
Gasoline	~~<2~~ 120 NJ	8 NJ	59 NJ
Spike level			
BFB	103	60	100

Snt 5.3.95

ICF ID	WAI-SS07-~~S01~~ SDØ1	WAI-SS07-~~S01~~ SDØ1	WAI-SS07-~~S01~~ SDØ1	WAI-SS07-~~S01~~ SDØ1
F&BI Number	1452	1452 dup	1452ms	1452 msd
Sample Type	soil	soil	soil	soil
Date Received	8/30/93	8/30/93	8/30/93	8/30/93
% Dry Weight	96			
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93
Leaded Gas				
JP-4	<50	<50		
Lube Oil	<100	<100		
Diesel	<50	<50	75	97
Spike Level			500	500
Unknown Semi-volatile				
Pentacosane	85	133	117	84
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93
PCB 1221	<0.1	<0.1		
PCB 1232	<0.1	<0.1		
PCB 1016	<0.1	<0.1		
PCB 1242	<0.1	<0.1		
PCB 1248	<0.1	<0.1		
PCB 1254	<0.1	<0.1	109	129
PCB 1260	<0.1	<0.1		
Spike Level			5	5
Dibutyl Chlorendate	140	140	150	150
Sequence Date	#5-09/01/93	#5-09/01/93		
alpha-BHC	<0.01 J	<0.01		
beta-BHC	<0.01	<0.01		
gamma-BHC	<0.01	<0.01		
delta-BHC	<0.01	<0.01		
Heptachlor	<0.01	<0.01		
Aldrin	<0.01	<0.01		
Heptachlor Epoxide	<0.01	<0.01		
Endosulfan I	<0.01	<0.01		
DDE	<0.01	<0.01		
Dieldrin	<0.01	<0.01		
Endrin	<0.01	<0.01		
Endosulfan II	<0.01	<0.01		
DDD	<0.01	<0.01		
Endrin Aldehyde	<0.01	<0.01		
DDT	<0.01	<0.01		
Endosulfan Sulfate	<0.01	<0.01		
Endrin Ketone	<0.01	<0.01		
Methoxy Chlor	~~<0.1~~ <0.5 J	<0.1		
Chlordane	<0.5 J	<0.5		
Dibutyl Chlorendate	86	89		
Spike Level				
Vol Sequence	#3&4-09/04/93	#3&4-09/04/93	#3&4-09/04/93	#3&4-09/04/93
CCl4	<0.02	<0.02	230	280
TCA	<0.02	<0.02	117	170
Benzene	<0.2 J	<0.2	100	135
TCE	<0.02	<0.02	98	132
Toluene	<0.2 J	<0.2	71	100
PCE	<0.02	0.39	109	140
Ethylbenzene	<0.2 J	<0.2	82	108
Xylenes	<0.4 J	<0.4	87	107
Gasoline	<2 J	<20		
Spike level			1	1
BFB	45 outside recovery limits	76	69	83

ICF ID	WAI-SS07-SD02	WAI-SS07-SD03	WAI-SS07-SD04	WAI-SS07-2SD05
F&BI Number	1454	1456	1450	1891
Sample Type	soil	soil	soil	soil
Date Received	8/30/93	8/30/93	8/30/93	9/7/93
% Dry Weight	70	90	87	18
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#6-09/10/93
Leaded Gas				
JP-4	<70	<50	<60	-270
Lube Oil	<140	<110	<120	77000
Diesel	<70	<50	<60	120000 hydraulic fluid J
Spike Level				
Unknown Semi-volatile				
Pentacosane	92	64	64	140
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	
PCB 1221	<0.1	<0.1	<0.1	
PCB 1232	<0.1	<0.1	<0.1	
PCB 1016	<0.1	<0.1	<0.1	
PCB 1242	<0.1	<0.1	<0.1	
PCB 1248	<0.1	<0.1	<0.1	
PCB 1254	<0.1	<0.1	<0.1	
PCB 1260	<0.1	<0.1	<0.1	
Spike Level				
Dibutyl Chlorendate	137	133	113	
Sequence Date	#5-09/01/93			
alpha-BHC	<0.01 J			
beta-BHC	<0.01			
gamma-BHC	<0.01			
delta-BHC	<0.01			
Heptachlor	<0.01			
Aldrin	<0.01			
Heptachlor Epoxide	<0.01			
Endosulfan I	<0.01			
DDE	<0.01			
Dieldrin	<0.01			
Endrin	<0.01			
Endosulfan II	<0.01			
DDD	<0.01			
Endrin Aldehyde	<0.01			
DDT	<0.01			
Endosulfan Sulfate	<0.01			
Endrin Ketone	<0.01			
Methoxy Chlor	~~<0.1~~ <0.5J			
Chlordane	<0.5 J			
Dibutyl Chlorendate	85			
Spike Level				
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	
CCl4	<0.02	<0.02	<0.02	
TCA	<0.02	<0.02	<0.02	
Benzene	<0.02J	<0.2J	<0.2 J	
TCE	<0.02	<0.02	<0.02	
Toluene	<0.02J	<0.2J	<0.2J	
PCE	<0.02	<0.02	<0.02	
Ethylbenzene	0.1 NJ	<0.2J	<0.2J	
Xylenes	0.5 NJ	<0.4J	<0.4J	
Gasoline	<2 J	<20J	<2 J	
Spike level				
BFB		84	113	

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ICF ID	WAI-SS07-2SD06	WAI-SS07-SW01	WAI-SS07-SW01	WAI-SS07-SW02
F&BI Number	1892	1464	1466	1468
Sample Type	soil	water	water	water
Date Received	9/7/93	8/30/93	8/30/93	8/30/93
% Dry Weight	70			
Sequence Date	#6-09/10/93	#5-09/01/93		#5-09/01/93
Leaded Gas				
JP-4	<80	<200		<200
Lube Oil	<160	<2000		<2000
Diesel	<80 J	~~200~~ <1000 J		~~<200~~ <1000
Spike Level				
Unknown Semi-volatile				
Pentacosane	120	95		78
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date		#5-09/01/93		#5-09/01/93
alpha-BHC		~~<0.01~~ <0.2 J		~~<0.01~~ <0.2 J
beta-BHC		~~<0.01~~		~~<0.01~~
gamma-BHC		~~<0.01~~		~~<0.01~~
delta-BHC		~~<0.01~~		~~<0.01~~
Heptachlor		~~<0.01~~		~~<0.01~~
Aldrin		~~<0.01~~		~~<0.01~~
Heptachlor Epoxide		~~<0.01~~		~~<0.01~~
Endosulfan I		~~<0.01~~		~~<0.01~~
DDE		~~<0.01~~		~~<0.01~~
Dieldrin		~~<0.01~~		~~<0.01~~
Endrin		~~<0.01~~		~~<0.01~~
Endosulfan II		~~<0.01~~		~~<0.01~~
DDD		~~<0.01~~		~~<0.01~~
Endrin Aldehyde		~~<0.01~~		~~<0.01~~
DDT		~~<0.01~~		~~<0.01~~
Endosulfan Sulfate		~~<0.01~~		~~<0.01~~
Endrin Ketone		~~<0.01~~		~~<0.01~~
Methoxy Chlor		~~<0.1~~ <10 J		~~<0.1~~ <10 J
Chlordane		~~<0.5~~ <10 J		~~<0.5~~ <10 J
Dibutyl Chlorendate		66		73
Spike Level				
Vol Sequence			#1&2-09/02/93	
CCl4				
TCA				
Benzene			<1	
TCE				
Toluene			<1	
PCE				
Ethylbenzene			<1	
Xylenes			<2	
Gasoline			<50 J	
Spike level				
BFB			99	

ICF ID	WAI-SS07-SW02	WAI-SS07-SW03	WAI-SS07-2SW04	WAI-SS07-2SW05
F&BI Number	1470	1474	1888	1889
Sample Type	water	water	water	water
Date Received	8/30/93	8/30/93	9/9/93	9/9/93
% Dry Weight				
Sequence Date		#5-09/01/93	#6-09/09/93	#6-09/09/93
Leaded Gas				
JP-4		<200	<1000	<1000
Lube Oil		<2000	<2000	<2000
Diesel		~~<200~~ <1000J	<1000J	<1000 J
Spike Level				
Unknown Semi-volatile				
Pentacosane		88	150	140
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#1&2-09/02/93	#1&2-09/02/93		
CCl4				
TCA				
Benzene	<1	<1		
TCE				
Toluene	<1	<1		
PCE				
Ethylbenzene	<1	<1		
Xylenes	<2	<2		
Gasoline	<50J	<50J		
Spike level				
BFB	100	99		

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ICF ID	WAI-SS07-2SW06
F&BI Number	1890
Sample Type	water
Date Received	9/9/93
% Dry Weight	
Sequence Date	#6-09/09/93
Leaded Gas	
JP-4	<1000
Lube Oil	<2000
Diesel	<1000J
Spike Level	
Unknown Semi-volatile	
Pentacosane	130
Sequence Date	
PCB 1221	
PCB 1232	
PCB 1016	
PCB 1242	
PCB 1248	
PCB 1254	
PCB 1260	
Spike Level	
Dibutyl Chlorendate	
Sequence Date	
alpha-BHC	
beta-BHC	
gamma-BHC	
delta-BHC	
Heptachlor	
Aldrin	
Heptachlor Epoxide	
Endosulfan I	
DDE	
Dieldrin	
Endrin	
Endosulfan II	
DDD	
Endrin Aldehyde	
DDT	
Endosulfan Sulfate	
Endrin Ketone	
Methoxy Chlor	
Chlordane	
Dibutyl Chlorendate	
Spike Level	
Vol Sequence	
CCl4	
TCA	
Benzene	
TCE	
Toluene	
PCE	
Ethylbenzene	
Xylenes	
Gasoline	
Spike level	
BFB	

ANALYTICAL DATA SHEETS FOR THE AIRSTRIP DIESEL (SS08)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4480-1
Client Sample ID :WAI SS08 SD02
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70339
Report Completed :11/03/93
Collected :08/29/93 @ 15:55 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.M., P.E.M. 8270: HOLDING TIME WAS EXCEEDED, SAMPLE NOT ANALIZED AS PER CLIENT.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Bromoform	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Bromomethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
tert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Carbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Chloroethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Chloroform	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Chloromethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
12Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM
Isopropylbenzene	0.025	U	mg/Kg	EPA 8260		09/03	09/04	MCM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4480-1
Client Sample ID :WAI SS08 SD02
Matrix :SOIL

p-Isopropyltoluene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Methylene Chloride	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Napthalene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Styrene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Toluene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Trichloroethene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,2,4-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
p+m-Xylene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM
o-Xylene	0.025	U	mg/Kg	EPA 8260	09/03	09/04	MCM

===

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4480-2
Client Sample ID :WAI SS08 SW02
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70339
Report Completed :11/03/93
Collected :08/29/93 @ 15:35 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.M., P.E.M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromoform	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chloroform	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4480-2
Client Sample ID :WAI SS08 SW02
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Napthalene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Styrene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Toluene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
n-Nitroso-di-n-Propyiam	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Isophorone	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
NCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

hemlab Ref.# :93.4480-2
Client Sample ID :WAI SS08 SW02
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluorene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Phenanthrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Chrysene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	22.3-25.5		mg/L	EPA 9060			09/13	CMR
...TOC Concentration	24.1		mg/L	EPA 9060			09/13	CMR
Residue, Non-Filterable	18		mg/L	EPA 160.2			09/03	TAV
Residue,Filterable(TDS)	457		mg/L	EPA 160.1	500		09/14	RJK

* See Special Instructions Above
See Sample Remarks Above
= Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	WAI-SS08-SD01	WAI-SS08-SD02	WAI-SS08-SD03	WAI-SS08-SD04
F&BI Number	1240	1242	1244	1246
Sample Type	soil	soil	soil	soil
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight	62	68	37	40
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
Leaded Gas				
JP-4	<80	<70	<140	<130
Lube Oil	<160	<140	<280	<250
Diesel	~~<90~~ <81	~~<130~~ <74	~~<190~~ <135	~~<220~~ <120
Spike Level				
Unknown Semi-volatile				
Pentacosane	72	102	78	120
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93
CCl4				
TCA				
Benzene	<0.03	<0.03	<0.05	<0.05
TCE				
Toluene	<0.03	<0.03	<0.05	~~0.08~~ 0.5 J
PCE				
Ethylbenzene	<0.03	<0.03	<0.05	<0.04
Xylenes	<0.06	<0.06	<0.1	<0.08
Gasoline	~~<2~~ <3 J	~~<1~~ <3 J	~~<3~~ <5 J	~~<2~~ <5 J
Spike level				
BFB	105	111	72	88

ICF ID	WAI-SS08-SD05	WAI-SS08-SW01	WAI-SS08-SW01	WAI-SS08-SW02
F&BI Number	1248	1267	1268	1262
Sample Type	soil	water	water	water
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight	28			
Sequence Date	#6-08/31/93	#5-09/01/93		#5-09/01/93
Leaded Gas				
JP-4	<180	<200		<200
Lube Oil	<360	<2000		<2000
Diesel	~~≤270~~ <180	~~≤200~~ <1000		~~≤200~~ <1000
Spike Level				
Unknown Semi-volatile	40 biological			
Pentacosane	84	87		90
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				#5-09/01/93
alpha-BHC				<0.2 J
beta-BHC				<0.2
gamma-BHC				<0.2
delta-BHC				<0.2
Heptachlor				<0.2
Aldrin				<0.2
Heptachlor Epoxide				<0.2
Endosulfan I				<0.2
DDE				<0.2
Dieldrin				<0.2
Endrin				<0.2
Endosulfan II				<0.2
DDD				<0.2
Endrin Aldehyde				<0.2
DDT				<0.2
Endosulfan Sulfate				<0.2
Endrin Ketone				<0.2
Methoxy Chlor				~~≤2~~ <10J
Chlordane				<10J
Dibutyl Chlorendate				130
Spike Level				
Vol Sequence			#3&4-09/02/93	
CCl4				
TCA				
Benzene			<1	
TCE				
Toluene			<1	
PCE				
Ethylbenzene			<1	
Xylenes			<2	
Gasoline			~~<50~~ <100J	
Spike level				
BFB			107	

[illegible] 5.3.95

ICF ID	WAI-SS08-SW02	WAI-SS08-SW03	WAI-SS08-SW03	WAI-SS08-SW04
F&BI Number	1264	1271	1272	1275
Sample Type	water	water	water	water
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight				
Sequence Date		#5-09/01/93		#5-09/01/93
Leaded Gas				
JP-4		<200		<200
Lube Oil		<2000		<2000
Diesel		~~<200~~ <1000		~~<200~~ <1000
Spike Level				
Unknown Semi-volatile				
Pentacosane		81		104
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#3&4-09/02/93		#3&4-09/02/93	
CCl4				
TCA				
Benzene	<1		<1	
TCE				
Toluene	<1		<1	
PCE				
Ethylbenzene	<1		<1	
Xylenes	<2		<2	
Gasoline	~~<50~~ <100J		~~<50~~ <100J	
Spike level				
BFB	110		105	

ICF ID	WAI-SS08-SW04
F&BI Number	1276
Sample Type	water
Date Received	8/29/93
% Dry Weight	
Sequence Date	
Leaded Gas	
JP-4	
Lube Oil	
Diesel	
Spike Level	
Unknown Semi-volatile	
Pentacosane	
Sequence Date	
PCB 1221	
PCB 1232	
PCB 1016	
PCB 1242	
PCB 1248	
PCB 1254	
PCB 1260	
Spike Level	
Dibutyl Chlorendate	
Sequence Date	
alpha-BHC	
beta-BHC	
gamma-BHC	
delta-BHC	
Heptachlor	
Aldrin	
Heptachlor Epoxide	
Endosulfan I	
DDE	
Dieldrin	
Endrin	
Endosulfan II	
DDD	
Endrin Aldehyde	
DDT	
Endosulfan Sulfate	
Endrin Ketone	
Methoxy Chlor	
Chlordane	
Dibutyl Chlorendate	
Spike Level	
Vol Sequence	#3&4-09/02/93
CCl4	
TCA	
Benzene	<1
TCE	
Toluene	<1
PCE	
Ethylbenzene	<1
Xylenes	<2
Gasoline	~~<50~~ <100J
Spike level	
BFB	117

Smt
5.3.95

ANALYTICAL DATA SHEETS FOR THE VEHICLE STORAGE AREA (SS09)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

emlab Ref.# :93.4483-4
Client Sample ID :WAI-SS09-S03
Matrix :SOIL

5633 B STREET
ANCHORAGE AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 15:56 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.
8270 NOT ANALYZED DUE TO HOLDING TIME BEING EXCEEDED.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics								
Benzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromobenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromochloromethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromodichloromethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromoform	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Bromomethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
n-Butylbenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
sec-Butylbenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
ert-Butylbenzne	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
arbon Tetrachloride	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chlorobenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloroform	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Chloromethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2-Chlorotoluene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
4-Chlorotoluene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromochloromethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
12Dibromo3Chloropropane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dibromoethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dibromomethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichlorobenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichlorobenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,4-Dichlorobenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Dichlorodifluoromethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloroethane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloroethene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
cis-1,2-Dichloroethene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
trans1,2-Dichloroethene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,2-Dichloropropane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,3-Dichloropropane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
2,2-Dichloropropane	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
1,1-Dichloropropene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Ethylbenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Hexachlorobutadiene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM
Isopropylbenzene	0.050	U	mg/Kg	EPA 8260		09/01	09/14	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

Chemlab Ref.# :93.4483-4
Client Sample ID :WAI-SS09-S03
Matrix :SOIL

p-Isopropyltoluene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Methylene Chloride	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Napthalene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
n-Propylbenzene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Styrene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1112-Tetrachloroethane	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1122-Tetrachloroethane	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Tetrachloroethene	0.330		mg/Kg	EPA 8260	09/01	09/14	KWM
Toluene	0.172		mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichlorobenzene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trichlorobenzene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,1-Trichloroethane	0.062		mg/Kg	EPA 8260	09/01	09/14	KWM
1,1,2-Trichloroethane	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichloroethene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Trichlorofluoromethane	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,3-Trichloropropane	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,2,4-Trimethylbenzene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
1,3,5-Trimethylbenzene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Vinyl Chloride	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
p+m-Xylene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
o-Xylene	0.050	U	mg/Kg	EPA 8260	09/01	09/14	KWM
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA	n/a		
Aluminum	1450		mg/Kg	EPA 6010	09/08	09/20	DFL
Antimony	37	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Arsenic	37	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Barium	170		mg/Kg	EPA 6010	09/08	09/20	DFL
Beryllium	18	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Cadmium	18	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Calcium	1500		mg/Kg	EPA 6010	09/08	09/20	DFL
Chromium	7.6		mg/Kg	EPA 6010	09/08	09/20	DFL
Cobalt	3.8		mg/Kg	EPA 6010	09/08	09/20	DFL
Copper	4.8		mg/Kg	EPA 6010	09/08	09/20	DFL
Iron	24400		mg/Kg	EPA 6010	09/08	09/20	DFL
Lead	36	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Magnesium	800		mg/Kg	EPA 6010	09/08	09/20	DFL
Manganese	230		mg/Kg	EPA 6010	09/08	09/20	DFL
Molybdenum	1.8	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Nickel	11		mg/Kg	EPA 6010	09/08	09/20	DFL
Potassium	230		mg/Kg	EPA 6010	09/08	09/21	DFL
Selenium	36	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Silver	18	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Sodium	170		mg/Kg	EPA 6010	09/08	09/20	DFL
Thallium	0.18	U	mg/Kg	EPA 7841	09/08	09/10	KAW
Vanadium	15		mg/Kg	EPA 6010	09/08	09/10	KAW
Zinc	23		mg/Kg	EPA 6010	09/08	09/10	KAW

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-5
Client Sample ID :WAI-SS09-S03 DUPLICATE
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 15:56 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Sample Preparation	---							
Total Metals Analysis	---			EPA 3050 Digest				
ICP Screen, ICP				- EPA	n/a			
Aluminum	1900		mg/Kg	EPA 6010		09/08	09/20	DFL
Antimony	37	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Arsenic	37	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Barium	150		mg/Kg	EPA 6010		09/08	09/20	DFL
Beryllium	19	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cadmium	19	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Calcium	1700		mg/Kg	EPA 6010		09/08	09/20	DFL
Chromium	16		mg/Kg	EPA 6010		09/08	09/20	DFL
Cobalt	7.5		mg/Kg	EPA 6010		09/08	09/20	DFL
Copper	6.0		mg/Kg	EPA 6010		09/08	09/20	DFL
Iron	62100		mg/Kg	EPA 6010		09/08	09/20	DFL
Lead	37	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Magnesium	1200		mg/Kg	EPA 6010		09/08	09/20	DFL
Manganese	560		mg/Kg	EPA 6010		09/08	09/20	DFL
Molybdenum	1.9	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Nickel	15		mg/Kg	EPA 6010		09/08	09/20	DFL
Potassium	190		mg/Kg	EPA 6010		09/08	09/21	DFL
Selenium	65		mg/Kg	EPA 6010		09/08	09/20	DFL
Silver	19	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Sodium	180		mg/Kg	EPA 6010		09/08	09/20	DFL
Thallium	0.18	U	mg/Kg	EPA 7841		09/08	09/10	KAW
Vanadium	19		mg/Kg	EPA 6010		09/08	09/20	DFL
Zinc	35		mg/Kg	EPA 6010		09/08	09/20	DFL

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 9[illegible]
TEL. (907) 562-[illegible]
FAX (907) 561-[illegible]

Chemlab Ref.# :93.4483-6
Client Sample ID :WAI-SS09-S03 SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 15:56 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Vomestead

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER H.G., AND JERRY M.
FOR 8260 SPIKE AND SPIKE DUPLICATE, SEE WO# 93.4397-2,3. 8270 NOT
ANALYZED DUE TO HOLDING TIME BEING EXCEEDED.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	2550		mg/Kg	EPA 6010		09/08	09/20	DFL
Antimony	41		mg/Kg	EPA 6010		09/08	09/20	DFL
Arsenic	78		mg/Kg	EPA 6010		09/08	09/20	DFL
Barium	223		mg/Kg	EPA 6010		09/08	09/20	DFL
Beryllium	35		mg/Kg	EPA 6010		09/08	09/20	DFL
Cadmium	43		mg/Kg	EPA 6010		09/08	09/20	DFL
Calcium	2300		mg/Kg	EPA 6010		09/08	09/20	[illegible]
Chromium	77		mg/Kg	EPA 6010		09/08	09/20	[illegible]
Cobalt	67		mg/Kg	EPA 6010		09/08	09/20	DFL
Copper	79		mg/Kg	EPA 6010		09/08	09/20	DFL
Iron	56600		mg/Kg	EPA 6010		09/08	09/20	DFL
Lead	76		mg/Kg	EPA 6010		09/08	09/20	DFL
Magnesium	2000		mg/Kg	EPA 6010		09/08	09/20	DFL
Manganese	550		mg/Kg	EPA 6010		09/08	09/20	DFL
Molybdenum	62		mg/Kg	EPA 6010		09/08	09/20	DFL
Nickel	78		mg/Kg	EPA 6010		09/08	09/20	DFL
Potassium	980		mg/Kg	EPA 6010		09/08	09/20	DFL
Selenium	128		mg/Kg	EPA 6010		09/08	09/21	DFL
Silver	18	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Sodium	866		mg/Kg	EPA 6010		09/08	09/20	DFL
Thallium	3.4		mg/Kg	EPA 7841		09/08	09/10	KAW
Vanadium	88		mg/Kg	EPA 6010		09/08	09/20	DFL
Zinc	104		mg/Kg	EPA 6010		09/08	09/20	DFL

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX (907) 561-5301

Chemlab Ref.# :93.4483-8
Client Sample ID :WAI-SS09-S06
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 15:17 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.
8270 NOT ANALYZED DUE TO HOLDING TIME BEING EXCEEDED..

Qualifiers/Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromobenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromochloromethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromodichloromethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromoform	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Bromomethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
n-Butylbenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
sec-Butylbenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
tert-Butylbenzne	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Carbon Tetrachloride	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chlorobenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloroform	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Chloromethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2-Chlorotoluene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
4-Chlorotoluene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromochloromethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
12Dibromo3Chloropropane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dibromoethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dibromomethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichlorobenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichlorobenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,4-Dichlorobenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Dichlorodifluoromethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloroethane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloroethene	0.100	U	mg/Kg	EPA 8260	(J)- D.1	09/01	09/15	KWM
cis-1,2-Dichloroethene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
trans1,2-Dichloroethene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,2-Dichloropropane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,3-Dichloropropane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
2,2-Dichloropropane	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
1,1-Dichloropropene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Ethylbenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Hexachlorobutadiene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM
Isopropylbenzene	0.100	U	mg/Kg	EPA 8260		09/01	09/15	KWM

cef 2-10-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-8
Client Sample ID :WAI-SS09-S06
Matrix :SOIL

			Qualifier		Comment				
p-Isopropyltoluene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Methylene Chloride	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Napthalene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
n-Propylbenzene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Styrene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1112-Tetrachloroethane	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1122-Tetrachloroethane	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Tetrachloroethene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Toluene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,2,3-Trichlorobenzene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,2,4-Trichlorobenzene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,1,1-Trichloroethane	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,1,2-Trichloroethane	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Trichloroethene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Trichlorofluoromethane	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,2,3-Trichloropropane	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,2,4-Trimethylbenzene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
1,3,5-Trimethylbenzene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Vinyl Chloride	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
p+m-Xylene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
o-Xylene	0.100	U		mg/Kg		EPA 8260	09/01	09/15	KWM
Sample Preparation	---					EPA 3050 Digest			
Total Metals Analysis	---					-			
ICP Screen, ICF						EPA	n/a		
Aluminum	1200			mg/Kg		EPA 6010	09/08	09/20	DFL
Antimony	51	U	J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Arsenic	5.1	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Barium	59		J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Beryllium	2.5	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Cadmium	2.5	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Calcium	1700			mg/Kg		EPA 6010	09/08	09/20	DFL
Chromium	5.3			mg/Kg		EPA 6010	09/08	09/20	DFL
Cobalt	5.1	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Copper	9.4			mg/Kg		EPA 6010	09/08	09/20	DFL
Iron	12300			mg/Kg		EPA 6010	09/08	09/20	DFL
Lead	5.1	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Magnesium	1060		J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Manganese	150		J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Molybdenum	2.5	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Nickel	5.5			mg/Kg		EPA 6010	09/08	09/20	DFL
Potassium	430		J	mg/Kg	C.1	EPA 6010	09/08	09/21	DFL
Selenium	51	U		mg/Kg		EPA 6010	09/08	09/20	DFL
Silver	25	U	R	mg/Kg	J.1	EPA 6010	09/08	09/20	DFL
Sodium	52			mg/Kg		EPA 6010	09/08	09/20	DFL
Thallium	0.24	U		mg/Kg		EPA 7841	09/08	09/10	KAW
Vanadium	9.0			mg/Kg		EPA 6010	09/08	09/20	DFL
Zinc	32			mg/Kg		EPA 6010	09/08	09/20	DFL

All chngs J.C 2/4/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-10
Client Sample ID :WAI-SS09-SW01
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 17:15 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloroethane	0.0016		mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-10
Client Sample ID :WAI-SS09-SW01
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/04	09/27	
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Isophorone	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	M

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-10
Client Sample ID :WAI-SS09-SW01
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluorene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Phenanthrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Chrysene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Total Metals Analysis	---			-				
ICP Screen, ICP				EPA	n/a			
Aluminum	9.7		mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.75		mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	71		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Iron	130		mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

5633 B STRE
ANCHORAGE, AK 995
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-10
Client Sample ID :WAI-SS09-SW01
Matrix :WATER

		Qualifier		Comment					
Magnesium	57		mg/L		EPA 6010		09/08	09/10	DLG
Manganese	3.8		mg/L		EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Nickel	0.051		mg/L		EPA 6010		09/08	09/10	DLG
Potassium	5.0	U	mg/L		EPA 6010		09/08	09/10	DLG
Selenium	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Silver	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Sodium	27		mg/L		EPA 6010		09/08	09/21	DFL
Thallium	0.0050	U	mg/L		EPA 7841		09/08	09/08	BMW
Vanadium	0.063		mg/L		EPA 6010		09/08	09/10	DLG
Zinc	3.3		mg/L		EPA 6010		09/08	09/10	DLG
Dissolved Metals Analys	---				-				
ICP Screen, ICF					EPA	n/a			
Aluminum	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Barium	0.22		mg/L		EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Calcium	57		mg/L		EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Copper	0.050	U	mg/L		EPA 6010		09/08	09/10	[illegible]
Iron	17		mg/L		EPA 6010		09/08	09/10	[illegible]
Lead	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Magnesium	48		mg/L		EPA 6010		09/08	09/10	DLG
Manganese	3.0		mg/L		EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Nickel	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Potassium	5.0	U	mg/L		EPA 6010		09/08	09/10	DLG
Selenium	0.10	U	mg/L		EPA 6010		09/08	09/10	DLG
Silver	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Sodium	27		mg/L		EPA 6010		09/08	09/21	DFL
Thallium	0.0050	U	mg/L		EPA 7841		09/08	09/08	BMW
Vanadium	0.050	U	mg/L		EPA 6010		09/08	09/10	DLG
Zinc	0.39		mg/L		EPA 6010		09/08	09/10	DLG
TOC, Nonpurgable					EPA 9060	n/a			
...TOC Range	103-110		mg/L		EPA 9060			09/14	CMR
...TOC Concentration	107		mg/L		EPA 9060			09/14	CMR
Residue, Non-Filterable	750		mg/L		EPA 160.2			09/03	TAV
Residue,Filterable(TDS)	587	J	mg/L	A.1	EPA 160.1	500	09/16	09/17	RJK

All chgs A.L 2/4/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-11
Client Sample ID :WAI-SS09-SW01 DUPLICATE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99515
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 17:15 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---							
ICP Screen, ICF				-				
Aluminum				EPA	n/a			
Antimony	8.4		mg/L	EPA 6010				
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.75		mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Chromium	71		mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Iron	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Lead	130		mg/L	EPA 6010		09/08	09/10	DLG
Magnesium	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Manganese	58		mg/L	EPA 6010		09/08	09/10	DLG
Molybdenum	3.8		mg/L	EPA 6010		09/08	09/10	DLG
Nickel	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Potassium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Selenium	5.0	U	mg/L	EPA 6010		09/08	09/10	DLG
Silver	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Sodium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Thallium	27		mg/L	EPA 6010		09/08	09/10	DLG
Vanadium	0.0050		mg/L	EPA 7841		09/08	09/21	DFL
Zinc	0.062		mg/L	EPA 6010		09/08	09/08	BMW
	3.3		mg/L	EPA 6010		09/08	09/10	DLG
						09/08	09/10	DLG
Dissolved Metals Analys	---							
ICP Screen, ICF				-				
Aluminum				EPA	n/a			
Antimony	0.10	U	mg/L	EPA 6010				
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.23		mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Chromium	58		mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
						09/08	09/10	DLG

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ENVIRONMENTAL LABORATORY SERVICES

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REPORT of ANALYSIS

Chemlab Ref.# :93.4483-11
Client Sample ID :WAI-SS09-SW01 DUPLICATE
Matrix :WATER

Iron	17		mg/L	EPA 6010	09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010	09/08	09/10	DLG
Magnesium	49		mg/L	EPA 6010	09/08	09/10	DLG
Manganese	3.0		mg/L	EPA 6010	09/08	09/10	DLG
Molybdenum	0.050	U	mg/L	EPA 6010	09/08	09/10	DLG
Nickel	0.050	U	mg/L	EPA 6010	09/08	09/10	DLG
Potassium	5.0		mg/L	EPA 6010	09/08	09/10	DLG
Selenium	0.10		mg/L	EPA 6010	09/08	09/10	DLG
Silver	0.050	U	mg/L	EPA 6010	09/08	09/10	DLG
Sodium	27		mg/L	EPA 6010	09/08	09/10	DLG
Thallium	0.0050	U	mg/L	EPA 7841	09/08	09/21	DFL
Vanadium	0.050	U	mg/L	EPA 6010	09/08	09/08	BMW
Zinc	0.40		mg/L	EPA 6010	09/08	09/10	DLG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-12
Client Sample ID :WAI-SS09-SW01 SPIKE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 17:15 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	19		mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.76		mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.98		mg/L	EPA 6010		09/08	09/10	DLG
Barium	1.73		mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.41		mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.50		mg/L	EPA 6010		09/08	09/10	DLG
Calcium	82		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	1.01		mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.99		mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.94		mg/L	EPA 6010		09/08	09/10	DLG
Iron	140		mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.99		mg/L	EPA 6010		09/08	09/10	DLG
Magnesium	67		mg/L	EPA 6010		09/08	09/10	DLG
Manganese	4.8		mg/L	EPA 6010		09/08	09/10	DLG
Molybdenum	0.96		mg/L	EPA 6010		09/08	09/10	DLG
Nickel	1.01		mg/L	EPA 6010		09/08	09/10	DLG
Potassium	12		mg/L	EPA 6010		09/08	09/10	DLG
Selenium	1.02		mg/L	EPA 6010		09/08	09/10	DLG
Silver	0.16		mg/L	EPA 6010		09/08	09/10	DLG
Sodium	38		mg/L	EPA 6010		09/08	09/10	DLG
Thallium	0.016		mg/L	EPA 7841		09/08	09/21	DFL
Vanadium	1.00		mg/L	EPA 6010		09/08	09/08	BMW
Zinc	14		mg/L	EPA 6010		09/08	09/10	DLG
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.91		mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.84		mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.94		mg/L	EPA 6010		09/08	09/10	DLG
Barium	1.21		mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.38		mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.49		mg/L	EPA 6010		09/08	09/10	DLG
Calcium	68		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.98		mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.97		mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.89		mg/L	EPA 6010		09/08	09/10	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-12
Client Sample ID :WAI-SS09-SW01 SPIKE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Iron	18	mg/L	EPA 6010	09/08	09/10	DL
Lead	0.94	mg/L	EPA 6010	09/08	09/10	DL:
Magnesium	59	mg/L	EPA 6010	09/08	09/10	DLC
Manganese	4.06	mg/L	EPA 6010	09/08	09/10	DLC
Molybdenum	0.97	mg/L	EPA 6010	09/08	09/10	DLC
Nickel	0.98	mg/L	EPA 6010	09/08	09/10	DLC
Potassium	10	mg/L	EPA 6010	09/08	09/10	DLG
Selenium	0.94	mg/L	EPA 6010	09/08	09/10	DLG
Silver	0.16	mg/L	EPA 6010	09/08	09/10	DLG
Sodium	37	mg/L	EPA 6010	09/08	09/10	DLG
Thallium	0.017	mg/L	EPA 7841	09/08	09/21	DFL
Vanadium	0.94	mg/L	EPA 6010	09/08	09/08	BMW
Zinc	1.34	mg/L	EPA 6010	09/08	09/10	DLG
				09/08	09/10	DLG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
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LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-5
Client Sample ID :WAI-SS09 2SW02
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 13:45 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG. 8270: FOR EXTRACTION BATCH ASSOCIATED WITH THIS SAMPLE A POSSIBLE ERROR DURING EXTRACTION PROCESS RESULTED IN NO RECOVERIES FOR PHENOLIC SURROGATE AND SPIKE COMPOUNDS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS VOC

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93:4694-5
Client Sample ID :WAI-SS09 2SW02
Matrix :WATER

Qualifier/Comments

Isopropylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	[illegible]
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	[illegible]
o-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Semivolatile Organics				EPA 8270			
Phenol	---		mg/L	EPA 8270 (R)-N.1			
bis(2-Chloroethyl)ether	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
2-Chlorophenol	---		mg/L	EPA 8270 (R)-N.1			
1,3-Dichlorobenzene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
1,4-Dichlorobenzene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
Benzyl Alcohol	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
1,2-Dichlorobenzene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
2-Methylphenol	---		mg/L	EPA 8270 (R)-N.1			
bis(2-Chloroisopropyl)e	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
4-Methylphenol	---		mg/L	EPA 8270 (R)-N.1			
n-Nitroso-di-n-Propylam	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
Hexachloroethane	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
Nitrobenzene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
Isophorone	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
2-Nitrophenol	---		mg/L	EPA 8270 (R)-N.1			
2,4-Dimethylphenol	---		mg/L	EPA 8270 (R)-N.1			
Benzoic Acid	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
bis(2-Chloroethoxy)Meth	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
2,4-Dichlorophenol	---		mg/L	EPA 8270 (R)-N.1			
1,2,4-Trichlorobenzene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
Naphthalene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
4-Chloroaniline	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
Hexachlorobutadiene	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
4-Chloro-3-Methylphenol	---		mg/L	EPA 8270 (R)-N.1			
2-Methylnaphthalene	0.011	U	mg/L	EPA 8270	09/11	10/16	[illegible]
Hexachlorocyclopentadie	0.011	U	mg/L	EPA 8270	09/11	10/16	GV
2,4,6-Trichlorophenol	---		mg/L	EPA 8270 (R)-N.1			

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-5
Client Sample ID :WAI-SS09 2SW02
Matrix :WATER

Qualifier Comments

2,4,5-Trichlorophenol	---		mg/L	EPA 8270(R)-N.I				
2-Chloronaphthalene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
2-Nitroaniline	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Dimethylphthalate	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Acenaphthylene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
2,6-Dinitrotoluene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
3-Nitroaniline	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Acenaphthene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
2,4-Dinitrophenol	---		mg/L	EPA 8270(R)-N.I				
4-Nitrophenol	---		mg/L	EPA 8270				
Dibenzofuran	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
2,4-Dinitrotoluene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Diethylphthalate	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
4-Chlorophenyl-Phenylet	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Fluorene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
4-Nitroaniline	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
4,6-Dinitro-2-Methylphe	---		mg/L	EPA 8270(R)-N.I				
n-Nitrosodiphenylamine	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
4-Bromophenyl-Phenyleth	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Hexachlorobenzene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Pentachlorophenol	---		mg/L	EPA 8270(R)-N.I				
Phenanthrene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Anthracene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
di-n-Butylphthalate	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Fluoranthene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Pyrene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Butylbenzylphthalate	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
3,3-Dichlorobenzidine	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(a)Anthracene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Chrysene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
bis(2-Ethylhexyl)Phthal	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
di-n-Octylphthalate	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(b)Fluoranthene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(k)Fluoranthene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(a)Pyrene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Indeno(1,2,3-cd)Pyrene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Dibenz(a,h)Anthracene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(g,h,i)Perylene	0.011	U	mg/L	EPA 8270		09/11	10/16	GV
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Barium	0.20		mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Calcium	40		mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-5
Client Sample ID :WAI-SS09 2SW02
Matrix :WATER

Qualifier Comment

Iron	12			mg/L		EPA 6010		09/18 09/22	DFL
Lead	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Magnesium	49			mg/L		EPA 6010		09/18 09/22	DFL
Manganese	0.13			mg/L		EPA 6010		09/18 09/22	DFL
Molybdenum	0.10	U	R	mg/L	J.1	EPA 6010		09/18 09/22	DFL
Nickel	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Potassium	5.0	U		mg/L		EPA 6010		09/18 09/22	DFL
Selenium	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Silver	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Sodium	45			mg/L		EPA 6010		09/18 09/24	DFL
Thallium	0.0050	U		mg/L		EPA 7841		09/18 09/23	KAW
Vanadium	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Zinc	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Dissolved Metals Analys	---					-			
ICP Screen, ICF						EPA	n/a		
Aluminum	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Antimony	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Arsenic	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Barium	0.14			mg/L		EPA 6010		09/18 09/22	DFL
Beryllium	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Cadmium	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Calcium	40			mg/L		EPA 6010		09/18 09/22	D
Chromium	0.050	U		mg/L		EPA 6010		09/18 09/22	D
Cobalt	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Copper	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Iron	0.25			mg/L		EPA 6010		09/18 09/22	DFL
Lead	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Magnesium	48			mg/L		EPA 6010		09/18 09/22	DFL
Manganese	0.070			mg/L		EPA 6010		09/18 09/22	DFL
Molybdenum	0.050	U	R	mg/L	J.1	EPA 6010		09/18 09/22	DFL
Nickel	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Potassium	5.0	U		mg/L		EPA 6010		09/18 09/22	DFL
Selenium	0.10	U		mg/L		EPA 6010		09/18 09/22	DFL
Silver	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Sodium	45			mg/L		EPA 6010		09/18 09/22	DFL
Thallium	0.0050	U		mg/L		EPA 7841		09/18 09/23	KAW
Vanadium	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Zinc	0.050	U		mg/L		EPA 6010		09/18 09/22	DFL
Residue, Non-Filterable	15			mg/L		EPA 160.2		09/14	TAV
Residue,Filterable(TDS)	425		J	mg/L	A.1	EPA 160.1	500	09/22	RJK

2/8/94

All chgs
s.l 2/17/94

Compiled:
SMF 11.16.94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

hemlab Ref.# :93.4694-6
lient Sample ID :WAI-SS09 2SW02 DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 13:45 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : [signature]

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Barium	0.20		mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Calcium	41		mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Iron	12		mg/L	EPA 6010		09/18	09/22	DFL
Lead	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Magnesium	48		mg/L	EPA 6010		09/18	09/22	DFL
Manganese	0.14		mg/L	EPA 6010		09/18	09/22	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/18	09/22	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Silver	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Sodium	46		mg/L	EPA 6010		09/18	09/24	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/18	09/23	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Barium	0.14		mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Calcium	40		mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1909

REPORT of ANALYSIS

5633 B STR...
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-6
Client Sample ID :WAI-SS09 2SW02 DUPLICATE
Matrix :WATER

Iron	0.24		mg/L	EPA 6010	09/18	09/22	DFL
Lead	0.10	U	mg/L	EPA 6010	09/18	09/22	DFL
Magnesium	49		mg/L	EPA 6010	09/18	09/22	DFL
Manganese	0.068		mg/L	EPA 6010	09/18	09/22	DFL
Molybdenum	0.050	U	mg/L	EPA 6010	09/18	09/22	DFL
Nickel	0.050	U	mg/L	EPA 6010	09/18	09/22	DFL
Potassium	5.0	U	mg/L	EPA 6010	09/18	09/22	DFL
Selenium	0.10	U	mg/L	EPA 6010	09/18	09/22	DFL
Silver	0.050	U	mg/L	EPA 6010	09/18	09/22	DFL
Sodium	45		mg/L	EPA 6010	09/18	09/24	DFL
Thallium	0.0050	U	[illegible]	EPA 7841	09/18	09/23	KAW
Vanadium	0.050	U	[illegible]	EPA 6010	09/18	09/22	DFL
Zinc	0.050	U	[illegible]	EPA 6010	09/18	09/22	DFL

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* See Special Instr... ns Above
** See Sample Remar... ove
U = Undetected, Repo... value is the practical quantification limit.
D = Secondary dilut...

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-7
Client Sample ID :WAI-SS09 2SW02 SPIKE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 13:45 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.96		mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.85		mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.94		mg/L	EPA 6010		09/18	09/22	DFL
Barium	1.2		mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.39		mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.44		mg/L	EPA 6010		09/18	09/22	DFL
Calcium	50		mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.96		mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.91		mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.93		mg/L	EPA 6010		09/18	09/22	DFL
Iron	13		mg/L	EPA 6010		09/18	09/22	DFL
Lead	0.91		mg/L	EPA 6010		09/18	09/22	DFL
Magnesium	58		mg/L	EPA 6010		09/18	09/22	DFL
Manganese	1.1		mg/L	EPA 6010		09/18	09/22	DFL
Molybdenum	0.94		mg/L	EPA 6010		09/18	09/22	DFL
Nickel	0.94		mg/L	EPA 6010		09/18	09/22	DFL
Potassium	14		mg/L	EPA 6010		09/18	09/22	DFL
Selenium	0.90		mg/L	EPA 6010		09/18	09/22	DFL
Silver	0.16		mg/L	EPA 6010		09/18	09/22	DFL
Sodium	56		mg/L	EPA 6010		09/18	09/22	DFL
Thallium	0.019		mg/L	EPA 7841		09/18	09/24	DFL
Vanadium	0.91		mg/L	EPA 6010		09/18	09/23	KAW
Zinc	0.92		mg/L	EPA 6010		09/18	09/22	DFL
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.93		mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.85		mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.95		mg/L	EPA 6010		09/18	09/22	DFL
Barium	1.1		mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.38		mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.45		mg/L	EPA 6010		09/18	09/22	DFL
Calcium	49		mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.97		mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.92		mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.93		mg/L	EPA 6010		09/18	09/22	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-7
Client Sample ID :WAI-SS09 2SW02 SPIKE
Matrix :WATER

Iron	1.2	mg/L	EPA 6010	09/18	09/22	DFL
Lead	0.92	mg/L	EPA 6010	09/18	09/22	DFL
Magnesium	58	mg/L	EPA 6010	09/18	09/22	DFL
Manganese	1.0	mg/L	EPA 6010	09/18	09/22	DFL
Molybdenum	0.96	mg/L	EPA 6010	09/18	09/22	DFL
Nickel	0.94	mg/L	EPA 6010	09/18	09/22	DFL
Potassium	14	mg/L	EPA 6010	09/18	09/22	DFL
Selenium	0.92	mg/L	EPA 6010	09/18	09/22	DFL
Silver	0.16	mg/L	EPA 6010	09/18	09/22	DFL
Sodium	55	mg/L	EPA 6010	09/18	09/24	DFL
Thallium	0.022	mg/L	EPA 7841	09/18	09/23	KAW
Vanadium	0.90	mg/L	EPA 6010	09/18	09/22	DFL
Zinc	0.90	mg/L	EPA 6010	09/18	09/22	DFL

===

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

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NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4695-4 08
Client Sample ID :WAI ~~STP~~ S01 3-1-94
Matrix :SOIL STKP

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70794
Report Completed :11/04/93
Collected :09/07/93 @ 14:45 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG. B = THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Qualifier/Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260	(J)-A.1	09/16	09/16	KWM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Bromoform	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Bromomethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
tert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Carbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Chloroethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Chloroform	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Chloromethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
12Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM
Isopropylbenzene	0.025	U	mg/Kg	EPA 8260		09/16	09/16	KWM

CAP
3-10-94

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-4
Client Sample ID :WAI ~~STKP~~ S01 08 3-1-94
Matrix :SOIL STKP

p-Isopropyltoluene	0.025	U	mg/Kg	EPA 8260(J)-A.J	09/16	09/16	KWI
Methylene Chloride	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Napthalene	0.053		mg/Kg	EPA 8260	09/16	09/16	KWI
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Styrene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Toluene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Trichloroethene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
1,2,4-Trimethylbenzene	0.028		mg/Kg	EPA 8260	09/16	09/16	KWI
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
p+m-Xylene	0.031		mg/Kg	EPA 8260	09/16	09/16	KWI
o-Xylene	0.025	U	mg/Kg	EPA 8260	09/16	09/16	KWI
Semivolatile Organics				EPA 8270			
Phenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	
bis(2-Chloroethyl)ether	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Chlorophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,3-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,4-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzyl Alcohol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,2-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Methylphenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
bis(2-Chloroisopropyl)e	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Methylphenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
n-Nitroso-di-n-Propylam	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachloroethane	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Nitrobenzene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Isophorone	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Nitrophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dimethylphenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzoic Acid	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
bis(2-Chloroethoxy)Meth	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dichlorophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,2,4-Trichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Naphthalene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Chloroaniline	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachlorobutadiene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Chloro-3-Methylphenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Methylnaphthalene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachlorocyclopentadie	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4,6-Trichlorophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4,5-Trichlorophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	

OP
2-10-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-4
Client Sample ID :WAI STRP S01 K 9/1/94
Matrix :SOIL

Qualifier/Comments

2-Chloronaphthalene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Nitroaniline	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Dimethylphthalate	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Acenaphthylene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,6-Dinitrotoluene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
3-Nitroaniline	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Acenaphthene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dinitrophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Nitrophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Dibenzofuran	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dinitrotoluene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Diethylphthalate	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Chlorophenyl-Phenylet	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Fluorene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Nitroaniline	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4,6-Dinitro-2-Methylphe	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
n-Nitrosodiphenylamine	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Bromophenyl-Phenyleth	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachlorobenzene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Pentachlorophenol	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Phenanthrene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Anthracene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
di-n-Butylphthalate	2.08	B	mg/Kg	EPA 8270 (U)-E.1	09/14	10/16	GV
Fluoranthene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Pyrene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Butylbenzylphthalate	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
3,3-Dichlorobenzidine	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(a)Anthracene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Chrysene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
bis(2-Ethylhexyl)Phthal	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
di-n-Octylphthalate	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(b)Fluoranthene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(k)Fluoranthene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(a)Pyrene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Indeno(1,2,3-cd)Pyrene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Dibenz(a,h)Anthracene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(g,h,i)Perylene	0.230	U	mg/Kg	EPA 8270	09/14	10/16	GV
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA n/a			
Aluminum	2800		mg/Kg	EPA 6010	09/16	09/20	DLG
Antimony	47	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Arsenic	47	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Barium	100		mg/Kg	EPA 6010	09/16	09/20	DLG
Beryllium	23	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Cadmium	2.3	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Calcium	3800		mg/Kg	EPA 6010	09/16	09/20	DLG
Chromium	8.4		mg/Kg	EPA 6010	09/16	09/20	DLG
Cobalt	4.7	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Copper	5.9		mg/Kg	EPA 6010	09/16	09/20	DLG

CAP
2-11-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-4
Client Sample ID :WAI STRP S01
Matrix :SOIL

Iron	17000		mg/Kg	EPA 6010	09/16	09/20	DLG
Lead	4.7	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Magnesium	1800		mg/Kg	EPA 6010	09/16	09/20	DLG
Manganese	160		mg/Kg	EPA 6010	09/16	09/20	DLG
Molybdenum	2.3	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Nickel	18		mg/Kg	EPA 6010	09/16	09/20	DLG
Potassium	640		mg/Kg	EPA 6010	09/16	09/20	DLG
Selenium	47	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Silver	23	U	mg/Kg	EPA 6010	09/16	09/20	DFL
Sodium	140		mg/Kg	EPA 6010	09/16	09/22	DFL
Thallium	0.25	U	mg/Kg	EPA 7841	09/16	09/17	BMW
Vanadium	16		mg/Kg	EPA 6010	09/16	09/20	DLG
Zinc	22		mg/Kg	EPA 6010	09/16	09/20	DLG
TOC, Soil	9880		mg/Kg	PSEP Ref Lab			

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-5
Client Sample ID :WAI ~~STRP~~ S02
Matrix :SOIL STKP
SMF 12.16.94

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70794
Report Completed :11/04/93
Collected :09/07/93 @ 14:48 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : C. Vomestead

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Bromobenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Bromochloromethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Bromoform	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Bromomethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
n-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
sec-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
tert-Butylbenzne	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Carbon Tetrachloride	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Chlorobenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Chloroethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Chloroform	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Chloromethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
2-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
4-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
12Dibromo3Chloropropane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,2-Dibromoethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Dibromomethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,4-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Dichlorodifluoromethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,1-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,2-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,1-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
cis-1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
trans1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,3-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
2,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
1,1-Dichloropropene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Hexachlorobutadiene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
Isopropylbenzene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM
p-Isopropyltoluene	0.020	U	mg/Kg	EPA 8260		09/16	09/30	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-5
Client Sample ID :WAI ~~STRP~~ S02 STKP
Matrix :SOIL

[illegible] 12-16-98

Methylene Chloride	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Napthalene	0.072		mg/Kg	EPA 8260	09/16	09/30	KWM
n-Propylbenzene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Styrene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1112-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Tetrachloroethene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Toluene	0.027		mg/Kg	EPA 8260	09/16	09/30	KWM
1,2,3-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1,2,4-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1,1,1-Trichloroethane	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1,1,2-Trichloroethane	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Trichloroethene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1,2,3-Trichloropropane	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
1,2,4-Trimethylbenzene	0.042		mg/Kg	EPA 8260	09/16	09/30	KWM
1,3,5-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8260	09/16	09/30	KWM
p+m-Xylene	0.076		mg/Kg	EPA 8260	09/16	09/30	KWM
o-Xylene	0.049		mg/Kg	EPA 8260	09/16	09/30	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	[illegible]
bis(2-Chloroethyl)ether	0.225	U	mg/Kg	EPA 8270	09/14	10/16	[illegible]
2-Chlorophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,3-Dichlorobenzene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,4-Dichlorobenzene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzyl Alcohol	0.694		mg/Kg	EPA 8270	09/14	10/16	GV
1,2-Dichlorobenzene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Methylphenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
bis(2-Chloroisopropyl)e	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Methylphenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
n-Nitroso-di-n-Propylam	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachloroethane	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Nitrobenzene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Isophorone	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Nitrophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dimethylphenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzoic Acid	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
bis(2-Chloroethoxy)Meth	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dichlorophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
1,2,4-Trichlorobenzene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Naphthalene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Chloroaniline	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachlorobutadiene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Chloro-3-Methylphenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Methylnaphthalene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachlorocyclopentadie	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4,6-Trichlorophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4,5-Trichlorophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2-Chloronaphthalene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4695-5
Client Sample ID :WAI ~~STRP~~ STKP S02 SMF 12.16.94
Matrix :SOIL

		Qualifier		Comment			
2-Nitroaniline	0.225	U	~~mg/Kg~~	EPA 8270	09/14	10/16	GV
Dimethylphthalate	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Acenaphthylene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,6-Dinitrotoluene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
3-Nitroaniline	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Acenaphthene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dinitrophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Nitrophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Dibenzofuran	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
2,4-Dinitrotoluene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Diethylphthalate	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Chlorophenyl-Phenylet	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Fluorene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Nitroaniline	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4,6-Dinitro-2-Methylphe	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
n-Nitrosodiphenylamine	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
4-Bromophenyl-Phenyleth	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Hexachlorobenzene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Pentachlorophenol	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Phenanthrene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Anthracene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
di-n-Butylphthalate	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Fluoranthene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Pyrene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Butylbenzylphthalate	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
3,3-Dichlorobenzidine	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(a)Anthracene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Chrysene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
bis(2-Ethylhexyl)Phthal	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
di-n-Octylphthalate	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(b)Fluoranthene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(k)Fluoranthene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(a)Pyrene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Indeno(1,2,3-cd)Pyrene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Dibenz(a,h)Anthracene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Benzo(g,h,i)Perylene	0.225	U	mg/Kg	EPA 8270	09/14	10/16	GV
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICP				EPA	n/a		
Aluminum	2800		mg/Kg	EPA 6010	09/16	09/20	DLG
Antimony	52	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Arsenic	52	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Barium	160		mg/Kg	EPA 6010	09/16	09/20	DLG
Beryllium	26	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Cadmium	2.6	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Calcium	3100	J	mg/Kg H,I	EPA 6010	09/16	09/20	DLG
Chromium	11		mg/Kg	EPA 6010	09/16	09/20	DLG
Cobalt	5.2	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Copper	8.0		mg/Kg	EPA 6010	09/16	09/20	DLG
Iron	16000		mg/Kg	EPA 6010	09/16	09/20	DLG

All chngs o.c. 2/10/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4695-5
Client Sample ID :WAI ~~STRP~~ STKP S02
Matrix :SOIL

gmf 12.16.94 Qualifier Comment

Lead	5.2	U	mg/Kg		EPA 6010	09/16 09/20	DLG
Magnesium	1700		mg/Kg		EPA 6010	09/16 09/20	DLG
Manganese	150		mg/Kg		EPA 6010	09/16 09/20	DLG
Molybdenum	2.6	U	mg/Kg		EPA 6010	09/16 09/20	DLG
Nickel	10		mg/Kg		EPA 6010	09/16 09/20	DLG
Potassium	690	J	mg/Kg	C.1	EPA 6010	09/16 09/20	DLG
Selenium	52	U	mg/Kg		EPA 6010	09/16 09/20	DLG
Silver	26	U J	mg/Kg	J.2	EPA 6010		DLG
Sodium	290	J	mg/Kg	C.1	EPA 6010	09/18 09/22	DFL
Thallium	0.24	U	mg/Kg		EPA 7841	09/16 09/17	BMW
Vanadium	17		mg/Kg		EPA 6010	09/16 09/20	DLG
Zinc	22		mg/Kg		EPA 6010	09/16 09/20	DLG
TOC, Soil	6780		mg/Kg		PSEP Ref Lab		

All chngs ac 2/10/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	WAI-SS09-S01-2.5	WAI-SS09-S02-2.5	WAI-SS09-S03-4	WAI-SS09-S04-0.75	WAI-SS09-S05-0.75
F&BI Number	1492	1494	1496	1502	1504
Sample Type	soil	soil	soil	soil	soil
Date Received	8/30/93	8/30/93	8/30/93	8/30/93	8/30/93
% Dry Weight	70	64	31	36	15
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93
Leaded Gas					
JP-4	<70	<80	<160	<140	<330
Lube Oil	<140	<160	<320	<280	<670
Diesel	<70	<80	<160	<140	<330
Spike Level					
Unknown Semi-volatile					
Pentacosane	115	76	125	126	86
Sequence Date	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93	#5-09/01/93
PCB 1221	<0.1	<0.1	~~<0.1~~ <0.3	~~<0.1~~ <0.3	~~<0.1~~ <0.7
PCB 1232	<0.1	<0.1	~~<0.1~~	~~<0.1~~	~~<0.1~~
PCB 1016	<0.1	<0.1	~~<0.1~~	~~<0.1~~	~~<0.1~~
PCB 1242	<0.1	<0.1	~~<0.1~~	~~<0.1~~	~~<0.1~~
PCB 1248	<0.1	<0.1	~~<0.1~~	~~<0.1~~	~~<0.1~~
PCB 1254	<0.1	<0.1	~~<0.1~~	~~<0.1~~	~~<0.1~~
PCB 1260	<0.1	<0.1	~~<0.1~~	~~<0.1~~	~~<0.1~~
Spike Level					
Dibutyl Chlorendate	160	~~160~~ 104	~~170~~ 104	150	146
Sequence Date					
alpha-BHC					
beta-BHC					
gamma-BHC					
delta-BHC					
Heptachlor					
Aldrin					
Heptachlor Epoxide					
Endosulfan I					
DDE					
Dieldrin					
Endrin					
Endosulfan II					
DDD					
Endrin Aldehyde					
DDT					
Endosulfan Sulfate					
Endrin Ketone					
Methoxy Chlor					
Chlordane					
Dibutyl Chlorendate					
Spike Level					
Vol Sequence	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93	#3&4-09/02/93
CCl4	<0.02	<0.02	<0.02	<0.02	<0.02
TCA	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	<0.2 J	<0.2	<0.2 J	<0.2 J	<0.2 J
TCE	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	<0.2 J	<0.2	<0.2 J	<0.2 J	<0.2 J
PCE	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	<0.2 J	<0.2	<0.2 J	<0.2 J	<0.2 J
Xylenes	<0.4 J	<0.4	<0.4 J	<0.4 J	<0.4 J
Gasoline	<2 J	<20 J	<20 J	<2 J	<2 J
Spike level					
BFB	71	75	81	65	72

SMF
5.3.95

SMF 5/3/95

ICF ID	WAI-SS09-S06	WAI-SS09-2S07 -1.5	WAI-SS09-SD01	WAI-SS09-SD02 -2
F&BI Number	1506	1898	1490	1884
Sample Type	soil	soil	soil	soil
Date Received	8/30/93	9/7/93	8/30/93	9/7/93
% Dry Weight	88	54	78	93
Sequence Date	#5-09/01/93	#6-09/10/93	#5-09/01/93	#6-09/10/93
Leaded Gas				
JP-4	<50	<100	<70	<60
Lube Oil	<110	<200	<130	<120
Diesel	<50	<100 J	<70	~~<60~~ <50 J
Spike L				
Unknown ... tile				
Pentacos	96	110	103	103
Sequence D	#5-09/01/93		#5-09/01/93	
PCB 1221	<0.1		<0.1	
PCB 1232	<0.1		<0.1	
PCB 1016	<0.1		<0.1	
PCB 1242	<0.1		<0.1	
PCB 1248	<0.1		<0.1	
PCB 1254	<0.1		<0.1	
PCB 1260	<0.1		<0.1	
Spike Level				
Dibutyl Chlorendate	138		136	
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#3&4-09/02/93	#1&2-09/10/93	#3&4-09/02/93	#1&2-09/10/93
CCl4	<0.02	<0.2 J	<0.02	<0.1 J
TCA	<0.02	<0.2 J	<0.02	<0.1 J
Benzene	<0.2 J	<0.04	<0.2 J	<0.02
TCE	<0.02	<0.2	<0.02	<0.1
Toluene	<0.2 J	<0.04	<0.2 J	<0.02
PCE	<0.02	<0.2	<0.02	<0.1
Ethylbenzene	<0.2 J	<0.04	<0.2 J	<0.02
Xylenes	<0.4 J	<0.08	<0.4 J	<0.04
Gasoline	<2 J	~~<4~~ <2 J	<2 J	<1 J
Spike level				
BFB	85	~~76~~ 86	74	89

ICF ID	WAI-STKP-S01	WAI-STKP-S02	WAI-SS09-SW01	WAI-SS09-SW01
F&BI Number	1900	1902	1444	1446
Sample Type	soil	soil	water	water
Date Received	9/7/93	9/7/93	8/30/93	8/30/93
% Dry Weight	83	88		
Sequence Date	#6-09/10/93	#6-09/10/93	#5-09/01/93	
Leaded Gas				
JP-4	<70	<70	<200	
Lube Oil	<140	<140	<2000	
Diesel	~~≤70~~ <60J	~~≤70~~ <60J	~~≤200~~ <1000	
Spike Level				
Unknown Semi-volatile				
Pentacosane	104	104	75	
Sequence Date			#5-09/01/93	
PCB 1221			<2J	
PCB 1232			<2	
PCB 1016			<2	
PCB 1242			<2	
PCB 1248			<2	
PCB 1254			<2	
PCB 1260			<2	
Spike Level				
Dibutyl Chlorendate			86	
Sequence Date			#5-09/01/93	
alpha-BHC			<0.01	
beta-BHC			<0.01	
gamma-BHC			<0.01	
delta-BHC			<0.01	
Heptachlor			<0.01	
Aldrin			<0.01	
Heptachlor Epoxide			<0.01	
Endosulfan I			<0.01	
DDE			<0.01	
Dieldrin			<0.01	
Endrin			<0.01	
Endosulfan II			<0.01	
DDD			<0.01	
Endrin Aldehyde			<0.01	
DDT			<0.01	
Endosulfan Sulfate			<0.01	
Endrin Ketone			<0.01	
Methoxy Chlor			<0.1	
Chlordane			<0.5	
Dibutyl Chlorendate			76	
Spike Level				
Vol Sequence	#1&2-09/10/93	#1&2-09/10/93		#1&2-09/02/93
CCl4	<0.1J	<0.1 J		<1
TCA	<0.1J	<0.1 J		<1
Benzene	<0.02	<0.02		<1
TCE	<0.1	<0.1		<1
Toluene	<0.02	<0.02		<1
PCE	<0.1	<0.1		<1
Ethylbenzene	<0.02	<0.02		<1
Xylenes	<0.04	<0.04		<2
Gasoline	<1J	<1J		<50J
Spike level				
BFB	92	88		99

[illegible] 5.3.95

ICF ID	WAI-SS09-2SW02	WAI-SS09-2SW02
F&BI Number	1880	1882
Sample Type	water	water
Date Received	9/9/93	9/9/93
% Dry Weight		
Sequence Date	#6-09/09/93	
Leaded Gas		
JP-4	<1000	
Lube Oil	<2000	
Diesel	<1000J	
Spike Level		
Unknown Semi-volatile		
Pentacosane	130	
Sequence Date	#6-09/09/93	
PCB 1221	~~<0.5~~ <2J	
PCB 1232	~~<0.5~~	
PCB 1016	~~<0.5~~	
PCB 1242	~~<0.5~~	
PCB 1248	~~<0.5~~	
PCB 1254	~~<0.5~~	
PCB 1260	~~<0.5~~	
Spike Level		
Dibutyl Chlorendate	127	
Sequence Date	#6-09/09/93	
alpha-BHC	~~<0.1~~ <0.2J	
beta-BHC	~~<0.1~~	
gamma-BHC	~~<0.1~~	
delta-BHC	~~<0.1~~	
Heptachlor	~~<0.1~~	
Aldrin	~~<0.1~~	
Heptachlor Epoxide	~~<0.1~~	
Endosulfan I	~~<0.1~~	
DDE	~~<0.1~~	
Dieldrin	~~<0.1~~	
Endrin	~~<0.1~~	
Endosulfan II	~~<0.1~~	
DDD	~~<0.1~~	
Endrin Aldehyde	~~<0.1~~	
DDT	~~<0.1~~	
Endosulfan Sulfate	~~<0.1~~	
Endrin Ketone	~~<0.1~~	
Methoxy Chlor	~~<1~~ <25J	
Chlordane	~~<5~~ <25J	
Dibutyl Chlorendate	127	
Spike Level		
Vol Sequence		#1&2-09/07/93
CCl4		<5
TCA		<5
Benzene		<1
TCE		<5
Toluene		<1
PCE		<5
Ethylbenzene		<1
Xylenes		<2
Gasoline		<50J
Spike level		
BFB		101

ANALYTICAL DATA SHEETS FOR BACKGROUND (BKGD)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

mlab Ref.# :93.4479-6
Client Sample ID :WAI BKGD S01
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 14:30 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T. THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromochloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromoform	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromomethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
n-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
ec-Butylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
ert-Butylbenzne	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Carbon Tetrachloride	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroform	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
4-Chlorotoluene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
12Dibromo3Chloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dibromoethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromomethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,4-Dichlorobenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dichlorodifluoromethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloroethane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
cis-1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
trans1,2-Dichloroethene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloropropene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Hexachlorobutadiene	0.020	U	mg/Kg	EPA 8260		09/01	09/06	KWM

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-6
Client Sample ID :WAI EKGD S01
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Isopropylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p-Isopropyltoluene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Methylene Chloride	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Napthalene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
n-Propylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Styrene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1112-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Tetrachloroethene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Toluene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,1-Trichloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,2-Trichloroethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichloroethene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichloropropane	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,3,5-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p+m-Xylene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethyl)ether	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chlorophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,3-Dichlorobenzene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,4-Dichlorobenzene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzyl Alcohol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2-Dichlorobenzene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylphenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroisopropyl)e	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Methylphenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitroso-di-n-Propylam	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachloroethane	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Nitrobenzene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Isophorone	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitrophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dimethylphenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzoic Acid	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethoxy)Meth	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dichlorophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2,4-Trichlorobenzene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Naphthalene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloroaniline	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobutadiene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloro-3-Methylphenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylnaphthalene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorocyclopentadie	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4,6-Trichlorophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-6
Client Sample ID :WAI BKGD S01
Matrix :SOIL

Qualifier/Comments

		Qualifier		Comment			
2,4,5-Trichlorophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chloronaphthalene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitroaniline	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Dimethylphthalate	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Acenaphthylene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,6-Dinitrotoluene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
3-Nitroaniline	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Acenaphthene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dinitrophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Nitrophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Dibenzofuran	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dinitrotoluene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Diethylphthalate	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chlorophenyl-Phenylet	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Fluorene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Nitroaniline	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4,6-Dinitro-2-Methylphe	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitrosodiphenylamine	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Bromophenyl-Phenyleth	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobenzene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Pentachlorophenol	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Phenanthrene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Anthracene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Di-n-Butylphthalate	1.69	B	mg/Kg	EPA 8270 (U) - E.1	09/12	10/19	GV
Fluoranthene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Pyrene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Butylbenzylphthalate	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
3,3-Dichlorobenzidine	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzo(a)Anthracene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Chrysene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Ethylhexyl)Phthal	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
di-n-Octylphthalate	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzo(b)Fluoranthene	0.200	U	mg/Kg	EPA 8270 (J) - D.1	09/12	10/19	GV
Benzo(k)Fluoranthene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzo(a)Pyrene	0.200	U	mg/Kg	EPA 8270 (J) D.1	09/12	10/19	GV
Indeno(1,2,3-cd)Pyrene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Dibenz(a,h)Anthracene	0.200	U	mg/Kg	EPA 8270 (J) D.1	09/12	10/19	GV
Benzo(g,h,i)Perylene	0.200	U	mg/Kg	EPA 8270	09/12	10/19	GV
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA n/a			
Aluminum	1500		mg/Kg	EPA 6010	09/08	09/20	DFL
Antimony	51	U J	mg/Kg J.2	EPA 6010	09/08	09/20	DFL
Arsenic	51	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Barium	110		mg/Kg	EPA 6010	09/08	09/20	DFL
Beryllium	2.6	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Cadmium	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Calcium	720		mg/Kg	EPA 6010	09/08	09/20	DFL
Chromium	26	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Cobalt	5.1	U	mg/Kg	EPA 6010	09/08	09/20	DFL

original changes D.L. 2/7/94

2-10-94

Compiled: SMT 11/6/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STR[illegible]
ANCHORAGE, AK 995[illegible]
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-6
Client Sample ID :WAI BKGD S01
Matrix :SOIL

		Qualfe		Comment				
Copper	3.8		mg/Kg		EPA 6010	09/08	09/20	DFL
Iron	13000		mg/Kg		EPA 6010	09/08	09/20	DFL
Lead	5.1	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Magnesium	360		mg/Kg		EPA 6010	09/08	09/20	DFL
Manganese	44	J	mg/Kg	J.2	EPA 6010	09/08	09/20	DFL
Molybdenum	2.6	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Nickel	5.6		mg/Kg		EPA 6010	09/08	09/20	DFL
Potassium	400	J	mg/Kg	C.1	EPA 6010	09/08	09/21	DFL
Selenium	51	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Silver	26	U	mg/Kg		EPA 6010	09/08	09/20	DFL
Sodium	58		mg/Kg		EPA 6010	09/08	09/20	DFL
Thallium	0.25	U	mg/Kg		EPA 7841	09/08	09/10	KAW
Vanadium	14		mg/Kg		EPA 6010	09/08	09/20	DFL
Zinc	13		mg/Kg		EPA 6010	09/08	09/20	DFL
TOC, Soil	10500		mg/Kg		PSEP Ref Lab			

all chgs [illegible] 2/7/94

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-4
Client Sample ID :WAI-BKGD 2S02
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 14:50 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG. B = THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Bromobenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Bromochloromethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Bromodichloromethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Bromoform	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Bromomethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
n-Butylbenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
sec-Butylbenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
tert-Butylbenzne	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Carbon Tetrachloride	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Chlorobenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Chloroethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Chloroform	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Chloromethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
2-Chlorotoluene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
4-Chlorotoluene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Dibromochloromethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
12Dibromo3Chloropropane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,2-Dibromoethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Dibromomethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,2-Dichlorobenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,3-Dichlorobenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,4-Dichlorobenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Dichlorodifluoromethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,1-Dichloroethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,2-Dichloroethane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,1-Dichloroethene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
cis-1,2-Dichloroethene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
trans1,2-Dichloroethene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,2-Dichloropropane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,3-Dichloropropane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
2,2-Dichloropropane	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
1,1-Dichloropropene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Ethylbenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Hexachlorobutadiene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM
Isopropylbenzene	0.060	U	mg/Kg	EPA 8260		09/10	09/28	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-4
Client Sample ID :WAI-BKGD 2S02
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

p-Isopropyltoluene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Methylene Chloride	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Napthalene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
n-Propylbenzene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Styrene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1112-Tetrachloroethane	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1122-Tetrachloroethane	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Tetrachloroethene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Toluene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,2,3-Trichlorobenzene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,2,4-Trichlorobenzene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,1,1-Trichloroethane	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,1,2-Trichloroethane	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Trichloroethene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Trichlorofluoromethane	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,2,3-Trichloropropane	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,2,4-Trimethylbenzene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
1,3,5-Trimethylbenzene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Vinyl Chloride	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
p+m-Xylene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
o-Xylene	0.060	U	mg/Kg	EPA 8260	09/10	09/28	KWM
Semivolatile Organics				EPA 8270			
Phenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	[illegible]
bis(2-Chloroethyl)ether	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2-Chlorophenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
1,3-Dichlorobenzene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
1,4-Dichlorobenzene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Benzyl Alcohol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
1,2-Dichlorobenzene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2-Methylphenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
bis(2-Chloroisopropyl)e	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
4-Methylphenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
n-Nitroso-di-n-Propylam	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Hexachloroethane	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Nitrobenzene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Isophorone	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2-Nitrophenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2,4-Dimethylphenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Benzoic Acid	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
bis(2-Chloroethoxy)Meth	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2,4-Dichlorophenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
1,2,4-Trichlorobenzene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Naphthalene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
4-Chloroaniline	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Hexachlorobutadiene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
4-Chloro-3-Methylphenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2-Methylnaphthalene	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
Hexachlorocyclopentadie	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2,4,6-Trichlorophenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV
2,4,5-Trichlorophenol	3.10	U	mg/Kg	EPA 8270	09/15	10/22	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

emlab Ref.# :93-.4694-4
Client Sample ID :WAI-BKGD 2S02
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Chloronaphthalene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
2-Nitroaniline	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Dimethylphthalate	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Acenaphthylene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,6-Dinitrotoluene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
3-Nitroaniline	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Acenaphthene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4-Dinitrophenol	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Nitrophenol	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Dibenzofuran	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4-Dinitrotoluene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Diethylphthalate	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Chlorophenyl-Phenylet	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Fluorene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Nitroaniline	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
4,6-Dinitro-2-Methylphe	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
n-Nitrosodiphenylamine	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Bromophenyl-Phenyleth	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Hexachlorobenzene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Pentachlorophenol	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Phenanthrene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Anthracene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
di-n-Butylphthalate	9.01	B	mg/Kg	EPA 8270		09/15	10/22	GV
luoranthene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
yrene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Butylbenzylphthalate	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
3,3-Dichlorobenzidine	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(a)Anthracene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Chrysene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
bis(2-Ethylhexyl)Phthal	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
di-n-Octylphthalate	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(b)Fluoranthene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(k)Fluoranthene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(a)Pyrene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Indeno(1,2,3-cd)Pyrene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Dibenz(a,h)Anthracene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(g,h,i)Perylene	3.10	U	mg/Kg	EPA 8270		09/15	10/22	GV
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	5900		mg/Kg	EPA 6010		09/16	09/20	DLG
Antimony	7.8	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Arsenic	7.8	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Barium	120		mg/Kg	EPA 6010		09/16	09/20	DLG
Beryllium	3.9	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Cadmium	3.9	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Calcium	690		mg/Kg	EPA 6010		09/16	09/20	DLG
Chromium	10		mg/Kg	EPA 6010		09/16	09/20	DLG
Cobalt	7.8	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Copper	7.2		mg/Kg	EPA 6010		09/16	09/20	DLG

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-4
Client Sample ID :WAI-BKGD 2S02
Matrix :SOIL

Iron	5400		mg/Kg	EPA 6010	09/16	09/20	DLG
Lead	7.8	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Magnesium	1200		mg/Kg	EPA 6010	09/16	09/20	DLG
Manganese	29		mg/Kg	EPA 6010	09/16	09/20	DLG
Molybdenum	3.9	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Nickel	7.6		mg/Kg	EPA 6010	09/16	09/20	DLG
Potassium	540		mg/Kg	EPA 6010	09/16	09/20	DLG
Selenium	7.8	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Silver	3.9	U	mg/Kg	EPA 6010	09/16	09/20	DLG
Sodium	47		mg/Kg	EPA 6010	09/16	09/21	DFL
Thallium	0.38	U	mg/Kg	EPA 7841	09/16	09/23	KAW
Vanadium	16		mg/Kg	EPA 6010	09/16	09/20	DLG
Zinc	14		mg/Kg	EPA 6010	09/16	09/20	DLG
TOC, Soil	44100		mg/Kg	PSEP Ref Lab			

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

emlab Ref.# :93.4479-5
Client Sample ID :WAI EKGD SD01
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 14:20 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Umestead

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T. THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromoform	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Bromomethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
tert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Carbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloroform	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Chloromethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
12Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		09/01	09/06	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-5
Client Sample ID :WAI BKGD SD01
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Isopropylbenzene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p-Isopropyltoluene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Methylene Chloride	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Napthalene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Styrene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Toluene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichloroethene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,2,4-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
p+m-Xylene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
o-Xylene	0.025	U	mg/Kg	EPA 8260	09/01	09/06	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethyl)ether	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Chlorophenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,3-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,4-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzyl Alcohol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylphenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroisopropyl)e	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Methylphenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
n-Nitroso-di-n-Propylam	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachloroethane	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Nitrobenzene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Isophorone	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Nitrophenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dimethylphenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Benzoic Acid	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
bis(2-Chloroethoxy)Meth	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4-Dichlorophenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
1,2,4-Trichlorobenzene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Naphthalene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloroaniline	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorobutadiene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
4-Chloro-3-Methylphenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2-Methylnaphthalene	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
Hexachlorocyclopentadie	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV
2,4,6-Trichlorophenol	0.230	U	mg/Kg	EPA 8270	09/12	10/19	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

mlab Ref.# :93.4479-5
Client Sample ID :WAI BKGD SD01
Matrix :SOIL

2,4,5-Trichlorophenol	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
2-Chloronaphthalene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
2-Nitroaniline	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dimethylphthalate	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Acenaphthylene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,6-Dinitrotoluene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
3-Nitroaniline	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Acenaphthene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,4-Dinitrophenol	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Nitrophenol	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dibenzofuran	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
2,4-Dinitrotoluene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Diethylphthalate	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Chlorophenyl-Phenylet	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Fluorene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Nitroaniline	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
4,6-Dinitro-2-Methylphe	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
n-Nitrosodiphenylamine	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
4-Bromophenyl-Phenyleth	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Hexachlorobenzene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Pentachlorophenol	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Phenanthrene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Anthracene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
n-Butylphthalate	2.03	B	mg/Kg	EPA 8270		09/12	10/19	GV
uoranthene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Pyrene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Butylbenzylphthalate	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
3,3-Dichlorobenzidine	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(a)Anthracene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Chrysene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
bis(2-Ethylhexyl)Phthal	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
di-n-Octylphthalate	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(b)Fluoranthene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(k)Fluoranthene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(a)Pyrene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Indeno(1,2,3-cd)Pyrene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Dibenz(a,h)Anthracene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Benzo(g,h,i)Perylene	0.230	U	mg/Kg	EPA 8270		09/12	10/19	GV
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	1600		mg/Kg	EPA 6010		09/08	09/20	DFL
Antimony	54	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Arsenic	5.4	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Barium	62		mg/Kg	EPA 6010		09/08	09/20	DFL
Beryllium	2.7	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cadmium	27	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Calcium	360		mg/Kg	EPA 6010		09/08	09/20	DFL
Chromium	27	U	mg/Kg	EPA 6010		09/08	09/20	DFL
Cobalt	5.4	U	mg/Kg	EPA 6010		09/08	09/20	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-5
Client Sample ID :WAI BKGD SD01
Matrix :SOIL

Copper	2.7	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Iron	5600		mg/Kg	EPA 6010	09/08	09/20	DFL
Lead	5.4	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Magnesium	400		mg/Kg	EPA 6010	09/08	09/20	DFL
Manganese	25		mg/Kg	EPA 6010	09/08	09/20	DFL
Molybdenum	2.7	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Nickel	4.4		mg/Kg	EPA 6010	09/08	09/20	DFL
Potassium	350		mg/Kg	EPA 6010	09/08	09/21	DFL
Selenium	54	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Silver	27	U	mg/Kg	EPA 6010	09/08	09/20	DFL
Sodium	41		mg/Kg	EPA 6010	09/08	09/20	DFL
Thallium	0.27	U	mg/Kg	EPA 7841	09/08	09/10	KAW
Vanadium	9.5		mg/Kg	EPA 6010	09/08	09/20	DFL
Zinc	9.2		mg/Kg	EPA 6010	09/08	09/20	DFL
TOC, Soil	43300		mg/Kg	PSEP Ref Lab			

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-1
Client Sample ID :WAI BKGD 2SD02
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 14:55 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG. B = THIS FLAG IS USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED BLANK AS WELL AS IN THE SAMPLE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.400	U	mg/Kg	EPA 8260 (J) -A1		09/20	09/28	KWM
Bromobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Bromochloromethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Bromodichloromethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Bromoform	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Bromomethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
n-Butylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
sec-Butylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
tert-Butylbenzne	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Carbon Tetrachloride	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Chlorobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Chloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Chloroform	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Chloromethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
2-Chlorotoluene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
4-Chlorotoluene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Dibromochloromethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
12Dibromo3Chloropropane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,2-Dibromoethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Dibromomethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,2-Dichlorobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,3-Dichlorobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,4-Dichlorobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Dichlorodifluoromethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,1-Dichloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,2-Dichloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,1-Dichloroethene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
cis-1,2-Dichloroethene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
trans1,2-Dichloroethene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,2-Dichloropropane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,3-Dichloropropane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
2,2-Dichloropropane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
1,1-Dichloropropene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Ethylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Hexachlorobutadiene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM
Isopropylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KWM

ccc
2-10-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS JCG

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-1
Client Sample ID :WAI BKGD 2SD02
Matrix :SOIL

					Qualifier / Comments			
p-Isopropyltoluene	0.400	U	mg/Kg	EPA 8260	(J)-A.1	09/20	09/28	KW
Methylene Chloride	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Napthalene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
n-Propylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Styrene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1112-Tetrachloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1122-Tetrachloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Tetrachloroethene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Toluene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,2,3-Trichlorobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,2,4-Trichlorobenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,1,1-Trichloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,1,2-Trichloroethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Trichloroethene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Trichlorofluoromethane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,2,3-Trichloropropane	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,2,4-Trimethylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
1,3,5-Trimethylbenzene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Vinyl Chloride	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
p+m-Xylene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
o-Xylene	0.400	U	mg/Kg	EPA 8260		09/20	09/28	KW
Semivolatile Organics				EPA 8270				
Phenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	[illegible]
bis(2-Chloroethyl)ether	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2-Chlorophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
1,3-Dichlorobenzene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
1,4-Dichlorobenzene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzyl Alcohol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
1,2-Dichlorobenzene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2-Methylphenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
bis(2-Chloroisopropyl)e	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Methylphenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
n-Nitroso-di-n-Propylam	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Hexachloroethane	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Nitrobenzene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Isophorone	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2-Nitrophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4-Dimethylphenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzoic Acid	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
bis(2-Chloroethoxy)Meth	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4-Dichlorophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
1,2,4-Trichlorobenzene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Naphthalene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Chloroaniline	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Hexachlorobutadiene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Chloro-3-Methylphenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2-Methylnaphthalene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Hexachlorocyclopentadie	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4,6-Trichlorophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4,5-Trichlorophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	[illegible]

CG
2-10-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Qualifier/Comment

Chemlab Ref.# :93.4694-1
Client Sample ID :WAI BKGD 2SD02
Matrix :SOIL

		Qualifier		Comment				
2-Chloronaphthalene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2-Nitroaniline	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Dimethylphthalate	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Acenaphthylene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,6-Dinitrotoluene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
3-Nitroaniline	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Acenaphthene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4-Dinitrophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Nitrophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Dibenzofuran	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
2,4-Dinitrotoluene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Diethylphthalate	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Chlorophenyl-Phenylet	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Fluorene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Nitroaniline	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4,6-Dinitro-2-Methylphe	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
n-Nitrosodiphenylamine	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
4-Bromophenyl-Phenyleth	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Hexachlorobenzene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Pentachlorophenol	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Phenanthrene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Anthracene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
di-n-Butylphthalate	83.4	B	mg/Kg	EPA 8270	(J)-E.1	09/15	10/22	GV
Fluoranthene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Pyrene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Butylbenzylphthalate	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
3,3-Dichlorobenzidine	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(a)Anthracene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Chrysene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
bis(2-Ethylhexyl)Phthal	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
di-n-Octylphthalate	32.0	U	mg/Kg	EPA 8270	(J)-D.1	09/15	10/22	GV
Benzo(b)Fluoranthene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(k)Fluoranthene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Benzo(a)Pyrene	32.0	U	mg/Kg	EPA 8270	(J)-D 1	09/15	10/22	GV
Indeno(1,2,3-cd)Pyrene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Dibenz(a,h)Anthracene	32.0	U	mg/Kg	EPA 8270	(J)-D 1	09/15	10/22	GV
Benzo(g,h,i)Perylene	32.0	U	mg/Kg	EPA 8270		09/15	10/22	GV
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	1500		mg/Kg	EPA 6010		09/16	09/20	DLG
Antimony	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Arsenic	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Barium	81		mg/Kg	EPA 6010		09/16	09/20	DLG
Beryllium	71	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Cadmium	7.1	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Calcium	2400	J	mg/Kg	EPA 6010	H.1	09/16	09/20	DLG
Chromium	7.1	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Cobalt	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Copper	7.1	U	mg/Kg	EPA 6010		09/16	09/20	DLG

Original changes
S.L.
2/10/95

2-10-94

Compiled:
Smf
11/1/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STR
ANCHORAGE, AK 99
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-1
Client Sample ID :WAI BKGD 2SD02
Matrix :SOIL

		Qualifier		Comment				
Iron	16000		mg/Kg		EPA 6010	09/16	09/20	DLG
Lead	14	U	mg/Kg		EPA 6010	09/16	09/20	DLG
Magnesium	510		mg/Kg		EPA 6010	09/16	09/20	DLG
Manganese	28		mg/Kg		EPA 6010	09/16	09/20	DLG
Molybdenum	7.1	U	mg/Kg		EPA 6010	09/16	09/20	DLG
Nickel	8.9		mg/Kg		EPA 6010	09/16	09/20	DLG
Potassium	710	U	mg/Kg		EPA 6010	09/16	09/20	DLG
Selenium	14	U	mg/Kg		EPA 6010	09/16	09/20	DLG
Silver	71	U J	mg/Kg	J.2	EPA 6010	09/16	09/20	DLG
Sodium	140		mg/Kg		EPA 6010	09/16	09/21	DFL
Thallium	0.76	U	mg/Kg		EPA 7841	09/16	09/23	KAW
Vanadium	9.9		mg/Kg		EPA 6010	09/16	09/20	DLG
Zinc	16		mg/Kg		EPA 6010	09/16	09/20	DLG
TOC, Soil	19400		mg/Kg		PSEP Ref Lab			

All chgs ... 2/1/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-2
Client Sample ID :WAI BKGD 2SD02 DUPLICATE
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 14:55 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : S C. Ede

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICP				EPA	n/a			
Aluminum	2500		mg/Kg	EPA 6010		09/16	09/20	DLG
Antimony	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Arsenic	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Barium	120		mg/Kg	EPA 6010		09/16	09/20	DLG
Beryllium	70	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Cadmium	7.0	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Calcium	2800		mg/Kg	EPA 6010		09/16	09/20	DLG
Chromium	7.0	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Cobalt	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Copper	8.8		mg/Kg	EPA 6010		09/16	09/20	DLG
Iron	16000		mg/Kg	EPA 6010		09/16	09/20	DLG
Lead	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Magnesium	690		mg/Kg	EPA 6010		09/16	09/20	DLG
Manganese	35		mg/Kg	EPA 6010		09/16	09/20	DLG
Molybdenum	7.0	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Nickel	13		mg/Kg	EPA 6010		09/16	09/20	DLG
Potassium	700	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Selenium	14	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Silver	7.0	U	mg/Kg	EPA 6010		09/16	09/20	DLG
Sodium	170		mg/Kg	EPA 6010		09/16	09/20	DLG
Thallium	0.76	U	mg/Kg	EPA 7841		09/16	09/21	DFL
Vanadium	13		mg/Kg	EPA 6010		09/16	09/23	KAW
Zinc	23		mg/Kg	EPA 6010		09/16	09/20	DLG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B ST
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93:4694-3
Client Sample ID :WAI-BKGD 2SD02 SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 14:55 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Sample Preparation	---			EPA 3050 Digest				
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	1900		mg/Kg	EPA 6010		09/16	09/20	DLG
Antimony	220		mg/Kg	EPA 6010		09/16	09/20	DLG
Arsenic	260		mg/Kg	EPA 6010		09/16	09/20	DLG
Barium	370		mg/Kg	EPA 6010		09/16	09/20	DLG
Beryllium	100		mg/Kg	EPA 6010		09/16	09/20	DLG
Cadmium	130		mg/Kg	EPA 6010		09/16	09/20	DLG
Calcium	4900		mg/Kg	EPA 6010		09/16	09/20	DLG
Chromium	270		mg/Kg	EPA 6010		09/16	09/20	[illegible]
Cobalt	260		mg/Kg	EPA 6010		09/16	09/20	DLG
Copper	270		mg/Kg	EPA 6010		09/16	09/20	DLG
Iron	18000		mg/Kg	EPA 6010		09/16	09/20	DLG
Lead	240		mg/Kg	EPA 6010		09/16	09/20	DLG
Magnesium	3000		mg/Kg	EPA 6010		09/16	09/20	DLG
Manganese	280		mg/Kg	EPA 6010		09/16	09/20	DLG
Molybdenum	250		mg/Kg	EPA 6010		09/16	09/20	DLG
Nickel	270		mg/Kg	EPA 6010		09/16	09/20	DLG
Potassium	2400		mg/Kg	EPA 6010		09/16	09/20	DLG
Selenium	250		mg/Kg	EPA 6010		09/16	09/20	DLG
Silver	22		mg/Kg	EPA 6010		09/16	09/20	DLG
Sodium	2600		mg/Kg	EPA 6010		09/16	09/21	DFL
Thallium	7.1		mg/Kg	EPA 7841		09/16	09/23	KAW
Vanadium	240		mg/Kg	EPA 6010		09/16	09/20	DLG
Zinc	270		mg/Kg	EPA 6010		09/16	09/20	DLG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4480-3
Client Sample ID :WAI BKGD SW01
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70339
Report Completed :11/03/93
Collected :08/29/93 @ 14:10 hrs
Received :08/31/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : Steph C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.M., P.E.M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromoform	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chloroform	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	MCM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4480-3
Client Sample ID :WAI BKGD SW01
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Napthalene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Styrene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Toluene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	MCM
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Isophorone	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
NCE 19C8

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4480-3
Client Sample ID :WAI BKGD SW01
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluorene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Phenanthrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Chrysene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.12		mg/L	EPA 6010		09/09	09/14	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Barium	0.052		mg/L	EPA 6010		09/09	09/14	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Calcium	8.2		mg/L	EPA 6010		09/09	09/14	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Copper	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Iron	0.90		mg/L	EPA 6010		09/09	09/14	DFL
Lead	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4480-3
Client Sample ID :WAI BKGD SW01
Matrix :WATER

Magnesium	3.5		mg/L	EPA 6010		09/09	09/14	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/09	09/14	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Silver	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Sodium	9.9		mg/L	EPA 6010		09/09	09/21	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/09	09/10	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Barium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Calcium	8.2		mg/L	EPA 6010		09/09	09/14	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/09	09/14	[illegible]
Copper	0.050	U	mg/L	EPA 6010		09/09	09/14	[illegible]
Iron	0.19		mg/L	EPA 6010		09/09	09/14	DFL
Lead	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Magnesium	3.4		mg/L	EPA 6010		09/09	09/14	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/09	09/14	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/09	09/14	DFL
Silver	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Sodium	10		mg/L	EPA 6010		09/09	09/21	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/09	09/10	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/09	09/14	DFL
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	6.07-9.83		mg/L	EPA 9060			09/13	CMR
...TOC Concentration	7.48		mg/L	EPA 9060			09/13	CMR
Residue, Non-Filterable	35		mg/L	EPA 160.2			09/03	TAV
Residue,Filterable(TDS)	91		mg/L	EPA 160.1	500		09/14	RJK

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-8
Client Sample ID :WAI-BKGD 2SW02
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 14:45 hrs
Received :09/09/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG. 8270: FOR EXTRACTION BATCH ASSOCIATED WITH THIS SAMPLE A POSSIBLE ERROR DURING EXTRACTION PROCESS RESULTED IN NO RECOVERIES FOR PHENOLIC SURROGATE AND SPIKE COMPOUNDS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-8
Client Sample ID :WAI-BKGD 2SW02
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Isopropylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Semivolatile Organics				EPA 8270			
Phenol	---		mg/L	EPA 8270			
bis(2-Chloroethyl)ether	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
2-Chlorophenol	---		mg/L	EPA 8270			
1,3-Dichlorobenzene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
1,4-Dichlorobenzene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Benzyl Alcohol	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
1,2-Dichlorobenzene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
2-Methylphenol	---		mg/L	EPA 8270			
bis(2-Chloroisopropyl)e	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
4-Methylphenol	---		mg/L	EPA 8270			
n-Nitroso-di-n-Propylam	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Hexachloroethane	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Nitrobenzene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Isophorone	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
2-Nitrophenol	---		mg/L	EPA 8270			
2,4-Dimethylphenol	---		mg/L	EPA 8270			
Benzoic Acid	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
bis(2-Chloroethoxy)Meth	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
2,4-Dichlorophenol	---		mg/L	EPA 8270			
1,2,4-Trichlorobenzene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Naphthalene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
4-Chloroaniline	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Hexachlorobutadiene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
4-Chloro-3-Methylphenol	---		mg/L	EPA 8270			
2-Methylnaphthalene	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
Hexachlorocyclopentadie	0.013	U	mg/L	EPA 8270	09/11	10/16	GV
2,4,6-Trichlorophenol	---		mg/L	EPA 8270			

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS JCC

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4694-8
Client Sample ID :WAI-BKGD 2SW02
Matrix :WATER

2,4,5-Trichlorophenol	---		mg/L	EPA 8270				
2-Chloronaphthalene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
2-Nitroaniline	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Dimethylphthalate	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Acenaphthylene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
2,6-Dinitrotoluene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
3-Nitroaniline	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Acenaphthene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
2,4-Dinitrophenol	---		mg/L	EPA 8270				
4-Nitrophenol	---		mg/L	EPA 8270				
Dibenzofuran	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
2,4-Dinitrotoluene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Diethylphthalate	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
4-Chlorophenyl-Phenylet	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Fluorene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
4-Nitroaniline	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
4,6-Dinitro-2-Methylphe	---		mg/L	EPA 8270				
n-Nitrosodiphenylamine	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
4-Bromophenyl-Phenyleth	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Hexachlorobenzene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Pentachlorophenol	---		mg/L	EPA 8270				
Phenanthrene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Anthracene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Di-n-Butylphthalate	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Fluoranthene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Pyrene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Butylbenzylphthalate	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
3,3-Dichlorobenzidine	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(a)Anthracene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Chrysene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
bis(2-Ethylhexyl)Phthal	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
di-n-Octylphthalate	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(b)Fluoranthene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(k)Fluoranthene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(a)Pyrene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Indeno(1,2,3-cd)Pyrene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Dibenz(a,h)Anthracene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Benzo(g,h,i)Perylene	0.013	U	mg/L	EPA 8270		09/11	10/16	GV
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.13		mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Barium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Calcium	4.5		mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93:4694-8
Client Sample ID :WAI-BKGD 2SW02
Matrix :WATER

5633 B STRE[illegible]
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Iron	1.2		mg/L	EPA 6010		09/18	09/22	DFL
Lead	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Magnesium	2.9		mg/L	EPA 6010		09/18	09/22	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/18	09/22	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Silver	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Sodium	8.4		mg/L	EPA 6010		09/18	09/24	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/18	09/23	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Barium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Calcium	4.1		mg/L	EPA 6010		09/18	09/22	[illegible]
Chromium	0.050	U	mg/L	EPA 6010		09/18	09/22	[illegible]
Cobalt	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Iron	0.63		mg/L	EPA 6010		09/18	09/22	DFL
Lead	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Magnesium	2.6		mg/L	EPA 6010		09/18	09/22	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/18	09/22	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Silver	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Sodium	8.2		mg/L	EPA 6010		09/18	09/24	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/18	09/23	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Residue, Non-Filterable	7		mg/L	EPA 160.2			09/14	TAV
Residue,Filterable(TDS)	151		mg/L	EPA 160.1	500		09/22	RJK

TOC not run because it was not preserved — Phone call w/ Matt Cohee confirmed ICF asked not to run.

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

Smf 5.3.9

ICF ID	WAI-BKGD-S01-0.5	WAI-BKGD-S01-0.5	WAI-BKGD-S01-0.5	WAI-BKGD-S01-0.5
F&BI Number	1236	1236 dup	1236 ms	1236 msd
Sample Type	soil	soil	soil	soil
Date Received	8/29/93	8/29/93	8/29/93	8/29/93
% Dry Weight	98			
Sequence Date	#6-08/31/93	#6-08/31/93	#6-08/31/93	#6-08/31/93
Leaded Gas				
JP-4	<50	<50		
Lube Oil	<100	<100		
Diesel	<50	<50	89	85
Spike Level			500	500
Unknown Semi-volatile				
Pentacosane	82	113	95	86
Sequence Date	#6-08/31/93			
PCB 1221	<0.1			
PCB 1232	<0.1			
PCB 1016	<0.1			
PCB 1242	<0.1			
PCB 1248	<0.1			
PCB 1254	<0.1			
PCB 1260	<0.1			
Spike Level				
Dibutyl Chlorendate	99			
Sequence Date	#6-09/03/93			
alpha-BHC	<0.01 J			
beta-BHC	<0.01			
gamma-BHC	<0.01			
delta-BHC	<0.01			
Heptachlor	<0.01			
Aldrin	<0.01			
Heptachlor Epoxide	<0.01			
Endosulfan I	<0.01			
DDE	<0.01			
Dieldrin	<0.01			
Endrin	<0.01			
Endosulfan II	<0.01			
DDD	<0.01			
Endrin Aldehyde	<0.01			
DDT	<0.01			
Endosulfan Sulfate	<0.01			
Endrin Ketone	<0.01			
Methoxy Chlor	~~<0.1~~ <0.5J			
Chlordane	<0.5J			
Dibutyl Chlorendate	94			
Spike Level				
Vol Sequence	#3&4-09/02/93			
CCl4	<0.02			
TCA	<0.02			
Benzene	<0.02			
TCE	<0.02			
Toluene	<0.02			
PCE	<0.02			
Ethylbenzene	<0.02			
Xylenes	<0.04			
Gasoline	~~<1~~ <2J			
Spike level				
BFB	103			

Smf
5.3.95

-0.5

ICF ID	WAI-BKGD--2S02	WAI-BKGD-SD01	WAI-BKGD--2SD02	WAI-BKGD-SW01
F&BI Number	1876	1238	1874	1284
Sample Type	soil	soil	soil	water
Date Received	9/7/93	8/29/93	9/7/93	8/29/93
% Dry Weight	66	88	18	
Sequence Date	#6-09/10/93	#6-08/31/93	#6-09/10/93	#5-09/01/93
Leaded Gas				
JP-4	<100	<60	<300	<200
Lube Oil	<200	<120	<600	<2000
Diesel	~~<100~~ <75	<60	<300 J	~~<200~~ <1000
Spike Level				
Unknown Semi-volatile				
Pentacosane	120	81	~~110~~ 164	101
Sequence Date	#6-09/10/93	#6-08/31/93	#6-09/10/93	#5-09/01/93
PCB 1221	~~<0.5~~ <0.8 J	<0.1	~~<0.5~~ <2.8 J	<2 J
PCB 1232	~~<0.5~~	<0.1	<0.5	<2
PCB 1016	~~<0.5~~	<0.1	<0.5	<2
PCB 1242	~~<0.5~~	<0.1	<0.5	<2
PCB 1248	~~<0.5~~	<0.1	<0.5	<2
PCB 1254	~~<0.5~~	<0.1	<0.5	<2
PCB 1260	~~<0.5~~	<0.1	<0.5	<2
Spike Level				
Dibutyl Chlorendate	120	85	110	93
Sequence Date	#6-09/10/93	#6-09/03/93	#6-09/10/93	#5-09/01/93
alpha-BHC	~~<0.01~~ <0.02 J	<0.01 J	~~<0.01~~ <0.06 J	<0.2 J
beta-BHC	~~<0.01~~	<0.01	~~<0.01~~	<0.2
gamma-BHC	~~<0.01~~	<0.01	~~<0.01~~	<0.2
delta-BHC	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Heptachlor	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Aldrin	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Heptachlor Epoxide	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Endosulfan I	~~<0.01~~	<0.01	~~<0.01~~	<0.2
DDE	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Dieldrin	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Endrin	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Endosulfan II	~~<0.01~~	<0.01	~~<0.01~~	<0.2
DDD	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Endrin Aldehyde	~~<0.01~~	<0.01	~~<0.01~~	<0.2
DDT	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Endosulfan Sulfate	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Endrin Ketone	~~<0.01~~	<0.01	~~<0.01~~	<0.2
Methoxy Chlor	~~<0.1~~ <0.80 J	~~<0.1~~ <0.5 J	~~<0.1~~ <2.8 J	~~<2~~ <10 J
Chlordane	~~<0.5~~ <0.80 J	<0.5 J	~~<0.5~~ <2.8 J	<10 J
Dibutyl Chlorendate	120	87	110	129
Spike Level				
Vol Sequence	#1&2-09/10/93	#3&4-09/02/93	#1&2-09/10/93	
CCl4	<0.1 J	<0.02	<0.5 J	
TCA	<0.1 J	<0.02	<0.5 J	
Benzene	<0.03	<0.02	<0.1	
TCE	<0.1	<0.02	<0.5	
Toluene	<0.03	<0.02	<0.1	
PCE	<0.1	<0.02	<0.5	
Ethylbenzene	<0.03	<0.02	<1	
Xylenes	<0.06	<0.04	<0.2	
Gasoline	<1 J	~~<1~~ <2 J	~~<1~~ <5 J	
Spike level				
BFB	85	112	95	

ICF ID	WAI-BKGD-SW01	WAI-BKGD-2SW02	WAI-BKGD-2SW02
F&BI Number	1286	1869	1870
Sample Type	water	water	water
Date Received	8/29/93	9/9/93	9/9/93
% Dry Weight			
Sequence Date		#6-09/09/93	
Leaded Gas			
JP-4		<1000	
Lube Oil		<2000	
Diesel		<1000 J	
Spike Level			
Unknown Semi-volatile			
Pentacosane		150	
Sequence Date		#6-09/09/93	
PCB 1221		~~<0.5~~ <2	
PCB 1232		~~<0.5~~	
PCB 1016		~~<0.5~~	
PCB 1242		~~<0.5~~	
PCB 1248		~~<0.5~~	
PCB 1254		~~<0.5~~	
PCB 1260		~~<0.5~~	
Spike Level			
Dibutyl Chlorendate		155 outside recovery limits	
Sequence Date		#6-09/09/93	
alpha-BHC		~~<0.1~~ <0.2	
beta-BHC		~~<0.1~~	
gamma-BHC		~~<0.1~~	
delta-BHC		~~<0.1~~	
Heptachlor		~~<0.1~~	
Aldrin		~~<0.1~~	
Heptachlor Epoxide		~~<0.1~~	
Endosulfan I		~~<0.1~~	
DDE		~~<0.1~~	
Dieldrin		~~<0.1~~	
Endrin		~~<0.1~~	
Endosulfan II		~~<0.1~~	
DDD		~~<0.1~~	
Endrin Aldehyde		~~<0.1~~	
DDT		~~<0.1~~	
Endosulfan Sulfate		~~<0.1~~	
Endrin Ketone		~~<0.1~~	
Methoxy Chlor		~~<1~~ <2.5	
Chlordane		~~<5~~ <25	
Dibutyl Chlorendate		150	
Spike Level			
Vol Sequence	#3&4-09/02/93		#1&2-09/07/93
CCl4	<10		<5
TCA	<10		<5
Benzene	<1		<1
TCE	<10		<5
Toluene	<1		<1
PCE	<10		<5
Ethylbenzene	<1		<1
Xylenes	<2		<2
Gasoline	~~<50~~ <100 J		<50 J
Spike level			
BFB	109		87

SMK 5/3/95

Sut 5.3.95

ICF ID	WAI-BKGD-2SW02
F&BI Number	1904
Sample Type	water
Date Received	9/9/93
% Dry Weight	
Sequence Date	
Leaded Gas	
JP-4	
Lube Oil	
Diesel	
Spike Level	
Unknown Semi-volatile	
Pentacosane	
Sequence Date	#6-09/09/93
PCB 1221	~~<0.5~~ <2 J
PCB 1232	~~≤0.5~~
PCB 1016	~~≤0.5~~
PCB 1242	~~<0.5~~
PCB 1248	~~≤0.5~~
PCB 1254	~~≤0.5~~
PCB 1260	~~<0.5~~
Spike Level	
Dibutyl Chlorendate	165 outside recovery limits
Sequence Date	#6-09/09/93
alpha-BHC	~~≤0.1~~ <0.2 J
beta-BHC	~~≤0.1~~
gamma-BHC	~~≤0.1~~
delta-BHC	~~≤0.1~~
Heptachlor	~~<0.1~~
Aldrin	~~<0.1~~
Heptachlor Epoxide	~~≤0.1~~
Endosulfan I	~~<0.1~~
DDE	~~≤0.1~~
Dieldrin	~~<0.1~~
Endrin	~~≤0.1~~
Endosulfan II	~~≤0.1~~
DDD	~~≤0.1~~
Endrin Aldehyde	~~≤0.1~~
DDT	~~<0.1~~
Endosulfan Sulfate	~~≤0.1~~
Endrin Ketone	~~≤0.1~~
Methoxy Chlor	~~≤1~~ <25 J
Chlordane	~~≤5~~ <25 J
Dibutyl Chlorendate	~~160~~ outside recovery limits
Spike Level	105%
Vol Sequence	
CCl4	
TCA	
Benzene	
TCE	
Toluene	
PCE	
Ethylbenzene	
Xylenes	
Gasoline	
Spike level	
BFB	

ANALYTICAL DATA SHEETS FOR QA/QC

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-7
Client Sample ID :WAI EB 01
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 17:30 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-7
Client Sample ID :WAI EB 01
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	09/04	09/27	[illegible]
2-Chlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Isophorone	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	09/04	09/27	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

emlab Ref.# :93.4479-7
Client Sample ID :WAI EB 01
Matrix :WATER

2-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Acenaphthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenzofuran	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Diethylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluorene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Phenanthrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Chrysene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		09/04	09/27	MTT
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	0.41		mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Iron	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STRE[illegible]
ANCHORAGE, AK 99[illegible]
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4479-7
Client Sample ID :WAI EB 01
Matrix :WATER

Qualifier/Comment

Magnesium	0.20	U		mg/L		EPA 6010	09/08	09/10	DLG
Manganese	0.050	U		mg/L		EPA 6010	09/08	09/10	DLG
Molybdenum	0.050	U		mg/L		EPA 6010	09/08	09/10	DLG
Nickel	0.050	U		mg/L		EPA 6010	09/08	09/10	DLG
Potassium	5.0	U		mg/L		EPA 6010	09/08	09/10	DLG
Selenium	0.10	U		mg/L		EPA 6010	09/08	09/10	DLG
Silver	0.050	U	R	mg/L	J.1	EPA 6010	09/08	09/10	DLG
Sodium	0.41			mg/L		EPA 6010	09/08	09/10	DLG
Thallium	0.005	U		mg/L		EPA 7841	09/08	09/08	BMW
Vanadium	0.050	U		mg/L		EPA 6010	09/08	09/10	DLG
Zinc	0.050	U		mg/L		EPA 6010	09/08	09/10	DLG
TOC, Nonpurgable						EPA 9060 n/a			
...TOC Range	5.0	U		mg/L		EPA 9060		09/13	CMR
...TOC Concentration	5.0	U		mg/L		EPA 9060		09/13	CMR

af 3/1/94

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4483-9
Client Sample ID :WAI-EB-02
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70336
Report Completed :10/28/93
Collected :08/30/93 @ 17:45 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, S.M., PETER M.G., AND JERRY M.
8270/8260: SAMPLE WAS LOGGED IN AS A SOIL, HOLDING TIME WAS MISSED DUE TO THIS AND SAMPLE WAS NOT ANALYZED.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICP				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Antimony	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Arsenic	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Barium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Beryllium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cadmium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Calcium	0.20	U	mg/L	EPA 6010		09/08	09/10	DLG
Chromium	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Cobalt	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Copper	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Iron	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Lead	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Magnesium	0.20	U	mg/L	EPA 6010		09/08	09/10	DLG
Manganese	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Nickel	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Potassium	5.0	U	mg/L	EPA 6010		09/08	09/10	DLG
Selenium	0.10	U	mg/L	EPA 6010		09/08	09/10	DLG
Silver	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
Sodium	0.25	U	mg/L	EPA 6010		09/08	09/10	DLG
Thallium	0.0050	U	mg/L	EPA 6010		09/08	09/21	DFL
Vanadium	0.050	U	mg/L	EPA 7841		09/08	09/08	BMW
Zinc	0.050	U	mg/L	EPA 6010		09/08	09/10	DLG
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	ND5.0-5.6		mg/L	EPA 9060			09/17	CMR
...TOC Concentration	5.0		mg/L	EPA 9060			09/17	CMR

* See Special Instructions Above
See Sample Remarks Above
U Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4695-3
Client Sample ID :WAI EB 03
Matrix :WATER

Client Name	:ICF KAISER ENGINEERING	WORK Order	:70794
Ordered By	:SHERI K ACE	Report Completed	:11/04/93
Project Name	:DEW LINE	Collected	:09/07/93 @ 17:00 hrs
Project#	:WAINWRIGHT	Received	:09/09/93 @ 12:00 hrs
PWSID	:UA	Technical Director	:STEPHEN C. EDE
		Released By	: C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/16	09/16	[illegible]
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/16	09/16	[illegible]
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4695-3
Client Sample ID :WAI1EB 03
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0041		mg/L	EPA 8260	09/16	09/16	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
bis(2-Chloroethyl)ether	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2-Chlorophenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
1,3-Dichlorobenzene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
1,4-Dichlorobenzene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Benzyl Alcohol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
1,2-Dichlorobenzene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2-Methylphenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
bis(2-Chloroisopropyl)e	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
4-Methylphenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
n-Nitroso-di-n-Propylam	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Hexachloroethane	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Nitrobenzene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Isophorone	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2-Nitrophenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2,4-Dimethylphenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Benzoic Acid	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
bis(2-Chloroethoxy)Meth	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2,4-Dichlorophenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
1,2,4-Trichlorobenzene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Naphthalene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
4-Chloroaniline	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Hexachlorobutadiene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
4-Chloro-3-Methylphenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2-Methylnaphthalene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
Hexachlorocyclopentadie	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2,4,6-Trichlorophenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2,4,5-Trichlorophenol	0.021	U	mg/L	EPA 8270	09/14	10/15	GV
2-Chloronaphthalene	0.021	U	mg/L	EPA 8270	09/14	10/15	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4695-3
Client Sample ID :WAI2EB 03
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Dimethylphthalate	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Acenaphthylene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
2,6-Dinitrotoluene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
3-Nitroaniline	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Acenaphthene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
2,4-Dinitrophenol	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
4-Nitrophenol	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Dibenzofuran	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
2,4-Dinitrotoluene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Diethylphthalate	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
4-Chlorophenyl-Phenylet	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Fluorene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
4-Nitroaniline	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
4,6-Dinitro-2-Methylphe	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
n-Nitrosodiphenylamine	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
4-Bromophenyl-Phenyleth	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Hexachlorobenzene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Pentachlorophenol	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Phenanthrene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Anthracene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
di-n-Butylphthalate	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Fluoranthene	0.021	U	mg/L	EPA 8270		09/14	10/15	V
Pyrene	0.021	U	mg/L	EPA 8270		09/14	10/15	V
Butylbenzylphthalate	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
3,3-Dichlorobenzidine	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Benzo(a)Anthracene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Chrysene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
bis(2-Ethylhexyl)Phthal	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
di-n-Octylphthalate	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Benzo(b)Fluoranthene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Benzo(k)Fluoranthene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Benzo(a)Pyrene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Indeno(1,2,3-cd)Pyrene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Dibenz(a,h)Anthracene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Benzo(g,h,i)Perylene	0.021	U	mg/L	EPA 8270		09/14	10/15	GV
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Antimony	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Arsenic	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Barium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Beryllium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cadmium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Calcium	0.20	U	mg/L	EPA 6010		09/18	09/22	DFL
Chromium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Cobalt	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Copper	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Iron	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Lead	0.10	U	mg/L	EPA 6010		09/18	09/22	L

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

Chemlab Ref.# :93.4695-3
Client Sample ID :WAI2EB 03
Matrix :WATER

[illegible] 25 May 95

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Magnesium	0.20	U	mg/L	EPA 6010		09/18	09/22	DFL
Manganese	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Molybdenum	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Nickel	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Potassium	5.0	U	mg/L	EPA 6010		09/18	09/22	DFL
Selenium	0.10	U	mg/L	EPA 6010		09/18	09/22	DFL
Silver	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Sodium	[illegible]37		mg/L	EPA 6010		09/18	09/24	DFL
Thallium	0.0050	U	mg/L	EPA 7841		09/18	09/23	KAW
Vanadium	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
Zinc	0.050	U	mg/L	EPA 6010		09/18	09/22	DFL
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	5.0	U	mg/L	EPA 9060			09/17	CMR
...TOC Concentration	5.0	U	mg/L	EPA 9060			09/17	CMR

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STRE[ET]
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4479-8
Client Sample ID :WAI TB 01
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70341
Report Completed :10/26/93
Collected :08/29/93 @ 12:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Homestead

Sample Remarks: SAMPLE COLLECTED BY: P.S.L., M. LEMMA, AND ROBERT T. SAMPLE NOT LISTED ON THE CHAIN OF CUSTODY.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/04	09/04	[illegible]
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/04	09/04	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

emlab Ref.# :93.4479-8
Client Sample ID :WAI TB 01
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/04	09/04	KWM

* See Special Instructions Above
** See Sample Remarks Above
Undetected, Reported value is the practical quantification limit.
= Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

SINCE 1908
COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4482-6
Client Sample ID :WAI TB 02
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70333
Report Completed :10/12/93
Collected :08/30/93 @ 12:00 hrs.
Received :08/31/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : [signature]

Sample Remarks: SAMPLE COLLECTED BY: M. LEMMA, PETER M.G., AND JERRY M.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/15	09/15	K
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	K
Chloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/15	09/15	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

E 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

mlab Ref.# :93'.4482-6
Client Sample ID :WAI TB 02
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/15	09/15	KWM

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* See Special Instructions Above
See Sample Remarks Above
Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-9
Client Sample ID :WAI-QTB 03
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :SHERI K ACE
Project Name :DEW LINE RI/FS
Project# :WAINWRIGHT
PWSID :UA

WORK Order :70791
Report Completed :11/01/93
Collected :09/07/93 @ 14:30 hrs.
Received :09/09/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: JM AND PJMG.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		09/16	09/16	[illegible]
Chlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	[illegible]
Chloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		09/16	09/16	KWM

COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4694-9
Client Sample ID :WAI-TB 03
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Styrene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Toluene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	09/16	09/16	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	WAI-AB-01	WAI-EB-01	WAI-EB-01	WAI-EB-02	WAI-EB-02
F&BI Number	1424	1280	1282	1498	1500
Sample Type	water	water	water	water	water
Date Received	8/30/93	8/29/93	8/29/93	8/30/93	8/30/93
% Dry Weight					
Sequence Date		#5-09/01/93		#5-09/01/93	
Leaded Gas					
JP-4		<200		<200	
Lube Oil		<2000		<2000	
Diesel		~~<200~~ <1000		~~<200~~ <1000	
Spike Level					
Unknown Semi-volatile					
Pentacosane		96		76	
Sequence Date		#5-09/01/93		#5-09/01/93	
PCB 1221		<2 J		<2	
PCB 1232		<2		<2	
PCB 1016		<2		<2	
PCB 1242		<2		<2	
PCB 1248		<2		<2	
PCB 1254		<2		<2	
PCB 1260		<2		<2	
Spike Level					
Dibutyl Chlorendate		100		96	
Sequence Date		#5-09/01/93		#5-09/01/93	
alpha-BHC		<0.2 J		~~<0.01~~ <0.2J	
beta-BHC		<0.2		~~<0.01~~	
gamma-BHC		<0.2		~~<0.01~~	
delta-BHC		<0.2		~~<0.01~~	
Heptachlor		<0.2		~~<0.01~~	
Aldrin		<0.2		~~<0.01~~	
Heptachlor Epoxide		<0.2		~~<0.01~~	
Endosulfan I		<0.2		~~<0.01~~	
DDE		<0.2		~~<0.01~~	
Dieldrin		<0.2		~~<0.01~~	
Endrin		<0.2		~~<0.01~~	
Endosulfan II		<0.2		~~<0.01~~	
DDD		<0.2		~~<0.01~~	
Endrin Aldehyde		<0.2		~~<0.01~~	
DDT		<0.2		~~<0.01~~	
Endosulfan Sulfate		<0.2		~~<0.01~~	
Endrin Ketone		<0.2		~~<0.01~~	
Methoxy Chlor		~~<2~~ <10J		~~<0.1~~ <10J	
Chlordane		<10J		~~<0.5~~ <10J	
Dibutyl Chlorendate		140		74	
Spike Level					
Vol Sequence	#1&2-09/02/93		#3&4-09/02/93		#1&2-09/02/93
CCl4	<1		<10		<1
TCA	<1		<10		<1
Benzene	<1		<1		<1
TCE	<1		<10		<1
Toluene	<1		<1		<1
PCE	<1		<10		<1
Ethylbenzene	<1		<1		<1
Xylenes	<2		<2		<2
Gasoline	<50 J		~~<50~~ <100J		<50 J
Spike level					
BFB	99		106		105

Suf 5.3.95

ICF ID	WAI-EB-03 -2	WAI-EB-03 -2	WAI-TB-01	WAI-TB-02	WAI-TB-03 -2
F&BI Number	1894	1896	1260	1422	1886
Sample Type	water	water	water	water	water
Date Received	9/9/93	9/9/93	8/29/93	8/30/93	9/9/93
% Dry Weight					
Sequence Date	#6-09/09/93				
Leaded Gas					
JP-4	<1000				
Lube Oil	<2000				
Diesel	<1000 J				
Spike Level					
Unknown Semi-volatile					
Pentacosane	130				
Sequence Date	#6-09/09/93				
PCB 1221	~~≤0.5~~ <2J				
PCB 1232	~~≤0.5~~				
PCB 1016	~~<0.5~~				
PCB 1242	~~≤0.5~~				
PCB 1248	~~≤0.5~~				
PCB 1254	~~<0.5~~				
PCB 1260	~~<0.5~~				
Spike Level					
Dibutyl Chlorendate	140				
Sequence Date	#6-09/09/93				
alpha-BHC	~~<0.1~~ <0.2J				
beta-BHC	~~<0.1~~				
gamma-BHC	~~<0.1~~				
delta-BHC	~~<0.1~~				
Heptachlor	~~≤0.1~~				
Aldrin	~~<0.1~~				
Heptachlor Epoxide	~~≤0.1~~				
Endosulfan I	~~≤0.1~~				
DDE	~~≤0.1~~				
Dieldrin	~~≤0.1~~				
Endrin	~~<0.1~~				
Endosulfan II	~~≤0.1~~				
DDD	~~<0.1~~				
Endrin Aldehyde	~~<0.1~~				
DDT	~~<0.1~~				
Endosulfan Sulfate	~~<0.1~~				
Endrin Ketone	~~<0.1~~				
Methoxy Chlor	~~<1~~ <25J				
Chlordane	~~≤5~~ <25J				
Dibutyl Chlorendate	140				
Spike Level					
Vol Sequence		#1&2-09/07/93	#3&4-09/02/93	#1&2-09/02/93	#1&2-09/07/93
CCl4		<5	<10	<1	<5
TCA		<5	<10	<1	<5
Benzene		<1	<1	<1	<1
TCE		<5	<10	<1	<5
Toluene		<1	<1	<1	<1
PCE		<5	<10	<1	<5
Ethylbenzene		<1	<1	<1	<1
Xylenes		<2	<2	<2	<2
Gasoline		<50J	~~<50~~ <100J	<50 J	<50J
Spike level					
BFB		102	108	99	102

APPENDIX G

DATA VALIDATION SUMMARIES

ICF KAISER ENGINEERS

ICF Kaiser Engineers, Inc.
1800 Harrison Street
P.O. Box 23210
Oakland, California 94612-3430
510/419-6000 FAX 510/419-5355

DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Wainwright (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Semivolatile Organic Compounds by USEPA Method 8270
MATRIX: Soil and Water
DATE: March 1, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received seven (7) soil samples and seven (7) water samples for semivolatile organic compound (SVOC) analyses by USEPA Method 8270 on August 29, 30, and September 7, 1993. The water samples were extracted on September 4, 6, 11, 14, 1993 and analyzed for SVOCs by gas chromatography/mass spectrometry (GC/MS) on September 27, 28, and October 1, 15, 16, 1993. The soil samples were extracted on September 6, 12, 14, 15, 1993 and analyzed for SVOCs by GC/MS on October 6, 16, 19, 20, 23, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-LF05-SW01	93.4478-01	Water
WAI-LF05-SD02	93.4479-01	Soil
WAI-LF05-S04-1.5	93.4479-02	Soil
WAI-BKGD-SW01	93.4479-06	Soil
WAI-EB-01	93.4479-07	Water
WAI-SS09-S06	93.4483-08	Water
WAI-EB-02	93.4483-09	Water
WAI-SS09-SW01	93.4483-10	Soil
WAI-SS07-SW01	93.4484-01	Water
WAI-SS07-SD01	93.4484-05	Soil
WAI-BKGD-2SD02	93.4694-01	Soil
WAI-SS09-2SW02	93.4694-05	Water
WAI-EB-03	93.4695-03	Water
WAI-STKP-S01	93.4695-04	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-EB-01, WAI-EB-02, and WAI-EB-03 were designated as "equipment blanks."

Sample numbers WAI-EB-02, WAI-SS09-S06 and WAI-SS07-SD01 were not analyzed by the laboratory due to exceeded holding time.

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

Laboratory reports for matrix spike (MS) and matrix spike duplicate (MSD) analyses associated with some project samples were not included with the data package. Therefore, the corresponding ICF sample numbers could not be determined and the laboratory sample numbers were referenced in comments F.2 and K.1 instead.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA SW-846 Method 8270, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project sample analyses.

B. GC/MS Instrument Performance Check:

B.1 All QC criteria for the decafluorotriphenylphosphine (DFTPP) tunes were met and the results are considered acceptable.

C. Initial Calibration:

C.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

D. Continuing Calibration:

D.1 The percent differences (%Ds) in the continuing calibrations exceeded the $\leq \pm 25\%$ QC validation criteria for several analytes in the continuing calibrations performed on September 8, and October 1, 16, 19, 20, 22, 1993. The detected results and quantitation limits for the analytes listed on Table A are considered estimated (J) and usable for limited purposes only (see modified sample data sheets and Table A).

E. Laboratory Blanks:

E.1 Target analyte di-n-butylphthalate was detected in the soil method blanks listed at concentrations above the Practical Quantitation Limit (PQL):

Date extracted	Analyte	Concentration
09/12/93	di-n-butylphthalate	1.41 mg/Kg
09/14/93	di-n-butylphthalate	0.878 mg/Kg
09/15/93	di-n-butylphthalate	0.741 mg/Kg

Due to method blank contamination, the result reported for di-n-butylphthalate in sample numbers WAI-LF05-SD02 and WAI-BKGD-2SD02 are considered as estimated (J) and usable for limited purposes only. Sample numbers WAI-STKP-S01, WAI-LF05-S04-1.5, and WAI-BKGD-S01 are considered non-detected (U) (see modified sample data sheets).

E.2 No other target analytes were detected in the method blanks at concentrations above the PQL and the results are considered acceptable.

F. Surrogate Recoveries:

F.1 All surrogate recoveries, except for terphenyl-d14, for the laboratory water method blank extracted on 09/06/93 were below the 10% QC validation criteria. Therefore, the quantitation limits for all associated target analytes are considered rejected (R) and unusable for any purpose (see modified sample data sheets).

F.2 The following percent surrogate recoveries, listed below, for sample numbers WAI-LF05-S04-1.5, 93.4482-03 MS, 93.4482-04 MSD, 93.4514-03 MS, and 93.4514-04 MSD were outside the method QC limits:

Sample No.	Analyte	Recovery	QC criteria
WAI-LF05-S04-1.5	2-fluorophenol	1%	43-116%
93.4482-03 MS	2-fluorophenol	19%	21-110%
93.4482-03 MS	2-fluorobiphenyl	40%	43-116%
93.4482-04 MSD	2-fluorophenol	17%	21-110%
93.4482-04 MSD	2-fluorobiphenyl	41%	43-116%
93.4514-03 MS	2-fluorobiphenyl	119%	30-115%
93.4514-04 MSD	2,4,6-tribromophenol	118%	30-115%

Due to the above listed surrogate recovery problem, the target analytes associated with 2-fluorophenol in sample number WAI-LF05-S04-1.5 are considered rejected (R) and unusable for any purpose (see modified sample data sheets).

F.3 All acid surrogate recoveries for the laboratory water method blank extracted on 09/11/93 were below the 10% QC validation criteria. Therefore, the quantitation limits for all target analytes are considered rejected (R) and unusable for any purpose (see modified sample data sheets).

F.4 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

G. Field Blanks:

G.1 The field blank analyses met all QC criteria and the results are considered acceptable.

H. Laboratory Control Sample Analysis:

H.1 Although all acid spike recoveries for the laboratory control sample and the laboratory control duplicate associated with sample numbers WAI-BKGD-2SD02 and WAI-SS09-2SW02 were below the 10% QC validation criteria, no data are qualified due to these low spike recoveries.

H.2 Laboratory control sample QC criteria were met for all other "blank spike" analyses and the results are considered acceptable.

I. Laboratory Replicate Analysis:

I.1 No laboratory replicate analysis is included with the project documentation.

J. Field Duplicate Analysis:

J.1 No field duplicate analysis is included with project documentation.

K. Matrix Spike/Matrix Spike Duplicate Analysis:

K.1 The MS/MSD recoveries in sample numbers 93.4482-03 MS, 93.4482-04 MSD, 93.4514-03 MS, and 93.4514-04 MSD did not meet the QC criteria as noted below.

Sample No.	Compound	Recovery	QC Limits
93.4482-03 MS	1,2,4-trichlorobenzene	38%	44-142%
93.4482-03 MS	acenapthene	43%	47-145%
93.4482-04 MSD	1,2,4-trichlorobenzene	38%	44-142%
93.4482-04 MSD	acenapthene	45%	47-145%
93.4514-03 MS	phenol	114%	26-90 %
93.4514-03 MS	n-nitro-di-n-propylamine	128%	41-126%
93.4514-03 MS	4-chloro-3-methylphenol	117%	26-103%
93.4514-03 MS	2,4-dinitrotoluene	101%	28-89 %
93.4514-03 MS	pentachlorophenol	110%	17-109%
93.4514-03 MS	di-n-butylphthalate	227%	1 -118%
93.4514-04 MSD	phenol	120%	26-90 %
93.4514-04 MSD	2,4-dinitrotoluene	100%	28-89 %
93.4514-04 MSD	pentachlorophenol	115%	17-109%
93.4514-04 MSD	4-chloro-3-methylphenol	120%	26-103%
93.4514-04 MSD	di-n-butylphthalate	256%	17-109%
93.4514-04 MSD	n-nitro-di-n-propylamine	130%	41-126%

According to USEPA guidelines, organic data are not qualified based on MS/MSD recoveries alone. It is the opinion of the reviewer that the recoveries in these samples are due to sample matrix interferences and the affect on the quality of the data is not known.

K.2 All other MS and MSD analyses met the QC criteria and are considered acceptable.

L. Internal Standards:

L.1 Internal standard areas for all analyses met applicable QC criteria and the

results are considered acceptable.

M. Quantitation and Identification:

M.1 No problems were observed with analyte quantitation and identification in project sample analyses.

N. System Performance:

N.1 All acid target analytes for the water sample analyses did not recover due to an error in the extraction process. Therefore, all acid target analytes are considered rejected (R) and unusable for any purpose (see modified sample sheets).

N.2 All other analyses met adequate system performance and the results are considered acceptable.

O. Conclusion:

O.1 Due to the above noted low surrogate recoveries and system performance, select data are considered rejected and unusable for any purposes.

O.2 Due to the above noted deficiencies in continuing calibration performance and laboratory blank contamination, select data are considered as estimates and usable for limited purposes only.

O.3 Due to the above noted laboratory blank contamination, select data are considered non-detected.

O.4 All other data are considered valid and usable for all purposes.

TABLE A
CALIBRATIONS OUTSIDE %D CRITERIA

Date	Compound	%D	Samples
Continuing Calibration - September 8, 1993	isophorone	44.9	blank(aq)
Continuing Calibration - October 1, 1993	pentachlorophenol	26.6	blank(aq)
Continuing Calibration - October 16, 1993	3,3'-dichlorobenzidine di-n-octylphthalate benzo(k)fluoranthene dibenz(a,h)anthracene	29.9 31.6 28.6 26.5	blank(soil)
Continuing Calibration - October 19, 1993	benzo(b)fluoranthene benzo(a)pyrene dibenz(a,h)anthracene	27.8 26.7 27.2	blank(soil) WAI-LF05-SD02 WAI-LF05-S04-1.5 WAI-BKGD-SW01
Continuing Calibration - October 20, 1993	di-n-octylphthalate benzo(k)fluoranthene benzo(a)pyrene	29.2 28.7 28.3	blank(soil)
Continuing Calibration - October 22, 1993	di-n-octylphthalate benzo(a)pyrene dibenz(a,h)anthracene	27.3 27.0 27.7	WAI-BKGD-2SD02

ICF KAISER ENGINEERS

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DATA VALIDATION REPORT

PROGRAM:	Elmendorf AFB/Wainwright RI/FS (ICF Project No.41096-412-02)
LABORATORY:	Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER:	Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS:	Volatile Organic Compounds by USEPA Method 8260
MATRIX:	Water and Soil
DATE:	March 1, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received seven (7) soils and eight (8) water samples for volatile organic compounds (VOC) analyses by USEPA Method 8260 on August 29, 30, and September 7, 1993. The samples were analyzed for VOCs by gas chromatography/mass spectrometry (GC/MS) on September 3, 4, 6, 15, 16, 28, and 30, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-LF05-SW01	93.4478-01	Water
WAI-LF05-SD02	93.4479-01	Soil
WAI-LF05-S04-1.5	93.4479-02	Soil
WAI-BKGD-S01	93.4479-06	Soil
WAI-EB-01	93.4479-07	Water
WAI-SS09-S06	93.4483-08	Soil
WAI-EB-02	93.4483-09	Water
WAI-SS09-SW01	93.4483-10	Water
WAI-SS07-SW01	93.4484-01	Water
WAI-SS07-SD01	93.4484-05	Soil
WAI-BKGD-2SD02	93.4694-01	Soil
WAI-SS09-2SW02	93.4694-05	Water
WAI-TB-03	93.4694-09	Water
WAI-EB-03	93.4695-03	Water
WAI-STKP-S01	93.4695-04	Soil

The following QC sample designations were included in project documentation: sample number WAI-TB-03 was designated as a "trip blank;" sample number WAI-EB-01, WAI-EB-02 and WAI-EB-03 were designated as "equipment blanks."

Sample number WAI-EB-02 was not analyzed by the laboratory due to exceeded holding times.

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

Laboratory reports for matrix spike (MS) and matrix spike duplicate (MSD) analyses associated with some project samples were note included with the data package. Therefore, the corresponding ICF sample numbers could not be determined and the laboratory sample numbers were referenced in comment K.1 instead.

It should be noted, that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA Method 8260. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA SW-846 Method 8260, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:

A.1 Sample numbers WAI-SS07-SW01, WAI-BKGD-2SD02, and WAI-STKP-S01 exceeded technical holding time criteria of 14 days as follows:

Sample No.	Collection Date	Analysis Date	Days Exceeded
WAI-SS07-SW01	08/30/93	09/15/93	9
WAI-BKGD-2SD02	09/07/93	09/28/93	7
WAI-STKP-S01	09/07/93	09/30/93	9

The quantitation limits and results for the above noted samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

A.2 Technical holding time QC criteria were met for all other project sample analyses.

B. GC/MS Instrument Performance Check:

B.1 All QC criteria for the bromofluorobenzene (BFB) tunes were met and the results are considered acceptable.

C. Initial Calibration:

C.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

D. Continuing Calibration:

D.1 The percent differences (%Ds) in the continuing calibrations exceeded the $\leq \pm 25\%$ QC validation criteria. The detected results and quantitation limits for the analytes listed in Table A are considered estimated (J) and usable for limited purposes only (see modified sample data sheets and Table A).

%Ds exceeding the $\leq \pm 25\%$ QC validation criteria were observed for several analytes in the continuing calibrations performed on September 14, 1993. These deviations are not expected to affect the quality of the results, except for those listed in Table A.

E. Laboratory Blanks:

E.1 No target analytes were detected in the method blanks at concentrations above the Practical Quantitation Limits (PQLs) and the results are considered acceptable.

F. Surrogate Recoveries:

F.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

G. Field Blanks:

G.1 Methylene chloride was detected in sample number WAI-EB-03 at a concentration of 0.0041 mg/L. However, methylene chloride was not found in any of the associated samples, therefore no data are qualified based on the above noted lab contamination.

G.2 No other target analytes were detected in the field blanks at concentrations above the PQLs and the results are considered acceptable.

H. Laboratory Control Sample Analysis:

H.1 Laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

I. Laboratory Replicate Analysis:

I.1 No laboratory replicate analysis was included with the project documentation.

J. Field Duplicate Analysis:

J.1 No field duplicate analysis was included with the project documentation.

K. Matrix Spike/Matrix Spike Duplicate Analysis:

K.1 The recoveries of 1,1-dichloroethene in the matrix spike (MS) and matrix spike duplicate (MSD) analyses of the following samples did not meet the laboratory established QC limits as noted below:

Sample No.	% Recovery	QC Limits
WAI-SS09-SW01 MS	58	80-120%
WAI-SS09-SW01 MSD	57	80-120%
93.4628-09 MS	19	80-120%
93.4628-10 MSD	19	80-120%
93.4962-13 MS	20	80-120%
93.4962-14 MSD	17	80-120%
93.4397-03 MS	15	80-120%
93.4397-10 MSD	17	80-120%

93.4424-04	MS	18	80-120%
93.4424-04	MSD	16	80-120%

According to USEPA data validation guidelines, organic data are not qualified based on MS/MSD QC outliers alone. It is the opinion of the reviewer that the low recoveries in these samples are due to sample matrix interferences, and the affect on the quality of the data is not known.

K.2 All other MS and MSD analyses met all applicable QC criteria and the results are considered acceptable.

L. Internal Standards:

L.1 Internal standard areas for all sample analyses were within specified QC criteria and the results are considered acceptable.

M. Quantitation and Identification:

M.1 No problems were observed with analyte quantitation and identification in project sample analyses.

N. Conclusion:

N.1 Due to deficiencies in the continuing calibrations and exceeded technical holding times, select data are considered estimated and usable for limited purposes only.

N.2 All other data are considered valid and usable for all purposes.

TABLE A CALIBRATIONS OUTSIDE %D CRITERIA			
Date	Compound	%D	Samples
Continuing Calibration - September 14, 1993	1,1-dichloroethene	30.2	WAI-SS09-S06

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DATA VALIDATION REPORT

PROGRAM:	Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY:	Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER:	Cynthia Schlag
ANALYSIS:	Total Organic Carbon by USEPA Method 9060
MATRIX:	Water and Soil
DATE:	March 1, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received three (3) water samples and five (5) soil samples for Total Organic Carbon (TOC) analysis by USEPA Method 9060 on August 29, and September 7, 1993. The water samples were analyzed by CT&E and the soil samples were analyzed by Twiss Analytical for TOC on September 13, 14, 17, and 24, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-LF05-SW01	93.4478-01	Water
WAI-LF05-SD02	93.4479-01	Soil
WAI-LF05-S04-1.5	93.4479-02	Soil
WAI-BKGD-S01	93.4479-06	Soil
WAI-EB-01	93.4479-07	Water
WAI-BKGD-2SD02	93.4694-01	Soil
WAI-EB-03	93.4695-03	Water
WAI-STKP-S01	93.4695-04	Soil

The following QC sample designation was included in project documentation: sample number WAI-EB-01 and WAI-EB-03 were designated as "equipment blanks."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis" (October 1989), USEPA Method 9060 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project samples.

B. Initial Calibrations:

B.1 The laboratory did not use multi-level calibration standards to quantitate values for the soil samples, as specified by the method. However, the single calibration standard used was within a reasonable range for accurate quantitation. Therefore, it is the opinion of the reviewer that the quality of the data is not affected and the results are considered acceptable.

B.2 All initial calibration criteria were met for all project water sample analyses and the results are considered acceptable.

C. Laboratory Blanks:

C.1 The target analyte was not detected in the method blanks at a concentration above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

D. Field Blanks:

D.1 The target analyte was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

E. Laboratory Control Sample Analysis:

E.1 The laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

F. Laboratory Replicate Analysis:

F.1 The laboratory replicate analyses met all QC criteria and the results are considered acceptable.

G. Field Duplicate Analysis:

G.1 No field duplicate analysis is included with project documentation.

H. Matrix Spike:

H.1 The water matrix spike recovery met all applicable QC criteria and the results are considered acceptable.

H.2 No soil matrix spike is included with project documentation.

I. Quantitation:

I.1 Although a single-point calibration standard was used to quantitate sample results, the quality of the data are affected and the results are considered acceptable.

I.2 No problems were encountered with sample quantitation and the results are considered acceptable.

J. Conclusion:

J.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total Organic Carbon by USEPA Method 9060
MATRIX: Water
DATE: February 15, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received two (2) water samples for Total Organic Carbon (TOC) analysis by USEPA Method 9060 on August 31, 1993. The samples were analyzed for TOC on September 14 and 17, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
WAI-EB-02	4483-9
WAI-SS09-SW01	4483-10

Sample number WAI-EB-02 was designated as an "equipment blank."

The analytical results are presented on the sample data sheets submitted by the laboratory (definitions of the data qualifiers are listed in Table 1B). This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 9060 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 All technical holding time criteria were met for project sample analyses.

B. Initial Calibrations:

B.1 Initial calibration QC criteria were met for all project sample analyses and the results are considered acceptable.

C. Continuing Calibrations:

C.1 Continuing calibration QC criteria were met for all project sample analyses and the results are considered acceptable.

D. Laboratory Blanks:

D.1 TOC was not detected in the method blank at a concentration above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

E. Field Blanks:

E.1 TOC was not detected in field equipment blank WAI-EB02 and the results are considered acceptable.

F. Laboratory Control Sample (LCS) Analysis:

F.1 The laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

G. Laboratory Replicate Analysis:

G.1 Laboratory replicate analyses submitted with project data met all applicable QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

H. Field Duplicate Analysis:

H.1 No field duplicate samples were included in the project documentation.

I. Matrix Spike:

I.1 All QC criteria for the matrix spike analyses were met and the results are considered acceptable.

J. Quantitation:

J.1 No problems were encountered with sample quantitation and the results are considered acceptable.

K. Conclusion:

K.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total Dissolved Solids by USEPA Method 160.1
MATRIX: Water
DATE: February 4, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received one (1) water sample for Total Dissolved Solids (TDS) analysis by USEPA Method 160.1 on August 31, 1993. The sample was analyzed for TDS on September 17, 1993.

The ICF site identification number and corresponding CT&E laboratory sample identification number are listed below.

ICF Site No.	Lab Sample No.
WAI-SS09-SW01	4483-10

The analytical result with qualifications is presented on the sample data sheet submitted by the laboratory. Definitions of data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 160.1 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The project sample was collected on August 30, 1993 and analyzed for TDS on September 17, 1993, exceeding the technical holding time QC criteria of seven (7) days by eleven (11) days. Therefore, the detected sample result in the above noted sample is considered an estimate (J) and usable for limited purposes only (see modified sample data sheet).

B. Calibration:

B.1 All applicable QC criteria were met for sample calibration analyses and the results are considered acceptable.

C. Laboratory Blanks:

C.1 TDS was not detected in the method blank associated with the sample at a concentration above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

D. Field Blanks:

D.1 There were no field blank analyses associated with the project sample.

E. Laboratory Replicate Analyses:

E.1 Laboratory replicate analyses submitted with project data met all applicable QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

F. Field Duplicate Analysis:

F.1 There were no field duplicate analyses associated with the project sample.

G. Quantitation:

G.1 No problems were encountered with sample quantitation.

H. Conclusion:

H.1 Due to the exceeded holding time, the sample result is considered an estimate and usable for limited purposes only.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total Dissolved Solids by USEPA Method 160.1
MATRIX: Water
DATE: February 10, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received two (2) water samples for Total Dissolved Solids (TDS) analysis by USEPA Method 160.1 on August 31 and September 9, 1993. The samples were analyzed for TDS on September 14 and 22, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
WAI-LF05-SW01	4478-1
WAI-SS09-2SW02	4694-5

The analytical results with qualifications are presented on the sample data sheets submitted by the laboratory. Definitions of data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 160.1 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The two project samples exceeded the technical holding time QC criteria of seven (7) days as follows:

Sample Number	Collection Date	Analysis Date	Days Exceeded
WAI-LF05-SW01	8/29/93	9/14/93	9
WAI-SS09-2SW02	9/07/93	9/22/93	8

Due to the above noted exceeded technical holding times, the detected result and sample quantitation limit in the project samples are considered estimates (J) and usable for limited purposes only (see modified sample data sheet).

B. Calibration:

B.1 All applicable QC criteria were met for sample calibration analyses and the results are considered acceptable.

C. Laboratory Blanks:

C.1 TDS was detected in the method blank associated with sample number WAI-SS09-2SW02 at a concentration of 14 mg/L. However, the reported TDS result in the above associated sample exceeded the method blank result by a factor of thirty (30), therefore, no adverse effect on data is expected.

D. Field Blanks:

D.1 There were no field blank analyses associated with the project samples.

E. Laboratory Replicate Analyses:

E.1 Laboratory replicate analyses submitted with project data met all applicable QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

F. Field Duplicate Analysis:

F.1 There were no field duplicate analyses associated with the project samples.

G. Quantitation:

G.1 No problems were encountered with sample quantitation.

H. Conclusion:

H.1 Due to the exceeded holding times, the sample results are considered estimated and usable for limited purposes only.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total Suspended Solids by USEPA Method 160.2
MATRIX: Water
DATE: February 11, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received two (2) water samples for Total Suspended Solids (TSS) analysis by USEPA Method 160.2 on August 31 and September 9, 1993. The samples were analyzed for TSS on September 3 and 14, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
WAI-LF05-SW01	4478-1
WAI-SS09-2SW02	4694-5

The analytical results are presented on the sample data sheets submitted by the laboratory (definitions of data qualifiers are listed in Table 1B). This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 160.2 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:
A.1 All technical holding time QC criteria were met for project sample analyses.

B. Calibration:
B.1 Method calibration is not a requirement for USEPA Method 160.2.

C. Laboratory Blanks:

C.1 TSS was not detected in the method blank associated with the project samples at a concentration above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

D. Field Blanks:

D.1 There were no field blanks analyses associated with the project samples.

E. Laboratory Replicate Analyses:

E.1 Laboratory replicate analyses submitted with project data met all applicable QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

F. Field Duplicate Analyses:

F.1 There were no field duplicate analyses associated with the project samples.

G. Quantitation:

G.1 No problems were encountered with sample quantitation.

H. Conclusion:

H.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total Suspended Solids by USEPA Method 160.2
MATRIX: Water
DATE: February 4, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received one (1) water sample for Total Suspended Solids (TSS) analysis by USEPA Method 160.2 on August 31, 1993. The sample was analyzed for TSS on September 3, 1993.

The ICF site identification number and corresponding CT&E laboratory sample identification number are listed below.

ICF Site No.	Lab Sample No.
WAI-SS09-SW01	4483-10

The analytical result is presented on the sample data sheet submitted by the laboratory (definitions of data qualifiers are listed in Table 1B). This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 160.2 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:
A.1 All technical holding time QC criteria were met for project sample analyses.

B. Calibration:
B.1 Method calibration is not a requirement for USEPA Method 160.2.

C. <u>Laboratory Blanks:</u>

C.1 TSS was not detected in the method blank associated with the sample at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

D. <u>Field Blanks:</u>

D.1 There were no field blanks analyses associated with the project sample.

E. <u>Laboratory Replicate Analyses:</u>

E.1 Laboratory replicate analyses submitted with project data met all applicable QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

F. <u>Field Duplicate Analyses:</u>

F.1 There were no field duplicate analyses associated with the project sample.

G. <u>Quantitation:</u>

G.1 No problems were encountered with sample quantitation.

H. <u>Conclusion:</u>

H.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total & Dissolved Metals by USEPA Method 6010 & Total & Dissolved Thallium by USEPA Method 7841
MATRIX: Soil & Water
DATE: February 10, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received four (4) water samples and three (3) soil samples for total and dissolved metals analyses by USEPA Methods 6010 and 7841 on August 31 and September 9, 1993. The samples were analyzed for total and dissolved metals by inductively coupled plasma atomic emission spectroscopy (ICP) and for total and dissolved thallium by atomic absorption furnace technique (GFAA) on September 8 through 24, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-LF05-SW01	4478-1	Water
WAI-LF05-SW01 (F)	4478-1	Water
WAI-SS07-SW01	4484-1	Water
WAI-SS07-SW01 (F)	4484-1	Water
WAI-SS07-SD01	4484-5	Soil
WAI-BKGD-2SD02	4694-1	Soil
WAI-SS09-2SW02	4694-5	Water
WAI-SS09-2SW02 (F)	4694-5	Water
WAI-EB-03	4695-3	Water
WAI-STRP-S02	4695-5	Soil

Sample number WAI-EB-03 was designated as an "equipment blank."

Sample numbers WAI-LF05-SW01 (F), WAI-SS07-SW01 (F) and WAI-SS09-2SW02 (F) were designated as field-filtered samples and analyzed for dissolved metals and thallium on September 8 through 24, 1993.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 6010, USEPA Method 7841, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 Initial calibration QC criteria were met for project sample analyses and the results are considered acceptable.

C. Continuing Calibrations:

C.1 Percent recoveries for the following analytes in the continuing calibration verification (CCV) checks fell outside the advisory QC criteria of 90-110%:

Associated Sample	Analyte	%Recovery	Bias
WAI-STRP-S02	Potassium	113	High
WAI-STRP-S02	Sodium	81	Low

Therefore, the detected results for the above analytes in the above noted samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

C.2 All other QC criteria were met for continuing calibration analyses and the results are considered acceptable.

D. Laboratory Blank Analyses:

D.1 No target analytes were detected in the method and calibration blanks (initial and continuing calibration blanks) above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

E. Field Blanks:

E.1 Target analyte sodium was detected in equipment blank WAI-EB-03 at a concentration of 0.37 mg/L. However, the reported sodium result in the above associated sample exceeded the equipment blank result by a factor of greater than ten (10), therefore, no adverse effect on data quality is expected.

E.2 No other target analytes were detected above the PQL in the above noted equipment blank.

F. Field Duplicate Analysis:
F.1 There were no field duplicate analyses included in the project documentation.

G. Laboratory Replicate Analysis:
G.1 A QC limit for precision of ≤ 20%, as measured by the RPD between water sample results, was specified for laboratory replicate comparability.

The RPD between analytical results for zinc in the associated sample WAI-SS07-SW01 was 167%, exceeding the advisory QC limit of ≤20%. Therefore, the analytical result for total zinc in the above noted sample is considered as an estimate (J) and usable for limited purposes only (see modified sample data sheets).

G.2 All other QC criteria for laboratory replicate analysis for water samples were met and the results are considered acceptable.

G.3 A QC limit for precision of ≤ 50%, as measured by the Relative Percent Difference (RPD) between soil sample results, was specified for laboratory replicate comparability. All QC criteria for laboratory replicate analysis for soil samples were met and the results are considered acceptable.

H. ICP Interference Check Sample (ICS) Analyses:
H.1 A percent recovery of 78% was reported for analyte calcium in associated sample numbers WAI-BKGD-2SD02 and WAI-STRP-S02, falling outside the advisory QC limits of 80-120%. Therefore, the detected results for calcium in the above noted samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

H.2 All other applicable QC criteria were met for the ICS analyses and the results are considered acceptable.

I. Laboratory Control Sample (LCS) Analyses:
I.1 A percent recovery of 62% was reported for silver in the associated sample WAI-LF05-SW01 (F), falling outside of the advisory QC limits of 80-120%. Therefore, the quantitation limit for dissolved silver in the above noted sample is considered as an estimate (J) and usable for limited purposes only (see modified sample data sheets).

I.2 All other LCS analyses associated with project samples met applicable QC criteria and the results are considered acceptable.

J. Matrix Spike (MS) Analysis:
J.1 The MS recovery for antimony and silver in associated sample number WAI-SS07-SD01 was 0%, significantly falling outside the advisory QC limits of 75-125%. Therefore, the quantitation limits for antimony and silver in the above noted sample are considered rejected (R) and unusable for any purpose (see modified sample

data sheet).

The MS recovery analysis for molybdenum analyte in the MS analyses associated with sample WAI-SS09-2SW02 was not performed. Therefore, the quantitation limit for molybdenum in the above noted sample is considered rejected (R) and unusable for any purpose (see modified sample data sheet).

J.2 The MS recoveries for the following analytes fell outside the advisory QC criteria of 75-125%:

Associated Sample	Analyte	%Recovery	Bias
WAI-LF05-SW01	Zinc	432	High
WAI-BKGD-2SD02	Silver	39	Low
WAI-STRP-S02	Silver	39	Low

Therefore, the detected analyte results and quantitation limits in the above listed samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

The MS recoveries for silver in associated sample numbers WAI-SS07-SW01 and WAI-SS07-SW01 (F) and antinomy in associated sample number WAI-EB-03 marginally fell outside the lower QC limit of 75%. It is the opinion of the reviewer that the above noted deviations have no adverse effect on data quality.

The detected result for zinc in sample number WAI-LF05-SW01 may be biased high.

The non-detected results for silver in sample numbers WAI-BKGD-2SD02 and WAI-STRP-S02 may be false-negatives.

J.3 Due to the above noted deviations in MS recoveries, post-digestion spike recovery analyses were performed and the recovery results met all applicable QC criteria.

J.4 All other applicable QC criteria were met for the MS analyses and the results are considered acceptable.

K. Quantitation:
K.1 No problems were observed with analyte quantitation in project sample analyses.

L. Conclusion:
L.1 Due to the above noted deficiencies in MS analyses, select data are considered rejected and unusable for any purpose.

L.2 Due to the above noted deficiencies in continuing calibration, ICP interference check, laboratory replicate analysis, LCS analysis and matrix spike analyses, select data are considered estimates and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

ICF KAISER ENGINEERS

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DATA VALIDATION REPORT

PROGRAM:	Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY:	Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER:	Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS:	Total Metals by USEPA Method 6010 & Thallium by USEPA Method 7841
MATRIX:	Soil & Water
DATE:	February 8, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received three (3) soil samples and one (1) water sample for total metals analyses by USEPA Methods 6010 and 7841 on August 29, 1993. The samples were digested on September 8, 1993 and were analyzed for total metals by inductively coupled plasma atomic emission spectroscopy (ICP) and for thallium by atomic absorption furnace technique (GFAA) on September 8 through 20, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-LF05-SD02	4479-1	Soil
WAI-LF05-S04-1.5	4479-2	Soil
WAI-BKGD-S01	4479-6	Soil
WAI-EB-01	4479-7	Water

Sample number WAI-EB-01 was designated as an "equipment blank."

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 6010, USEPA Method 7841, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 Initial calibration QC criteria were met for project sample analyses and the results are considered acceptable.

C. Continuing Calibrations:
C.1 The percent recovery for potassium in the continuing calibration verification (CCV) check associated with sample numbers WAI-LF05-SD02, WAI-LF05-S04-1.5 and WAI-BKGD-S01 was 85%, falling outside the advisory QC criteria of 90-110%. Therefore, the detected results for potassium in the above noted samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

C.2 All other QC criteria were met for continuing calibration analyses and the results are considered acceptable.

D. Laboratory Blank Analyses:
D.1 No target analytes were detected in the method and calibration blanks (initial and continuing calibration blanks) above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

E. Field Blanks:
E.1 No target analytes were detected in the equipment blank WAI-EB-01 and the results are considered acceptable.

F. Field Duplicate Analysis:
F.1 There were no field duplicate analyses included in the project documentation.

G. Laboratory Replicate Analysis:
G.1 There were no laboratory replicate analysis performed for the listed project samples.

H. ICP Interference Check Sample (ICS) Analyses:
H.1 All applicable QC criteria were met for the ICS analyses and the results are considered acceptable.

I. Laboratory Control Sample (LCS) Analyses:
I.1 All LCS analyses associated with project samples met applicable QC criteria and the results are considered acceptable.

J. Matrix Spike (MS) Analysis:
J.1 The MS recovery for silver in associated sample number WAI-EB-01 was 0%, falling outside the established QC limits of 75-125%. Therefore, the non-detected result for silver in the

above noted sample is considered rejected (R) and unusable for any purpose (see modified sample data sheets).

J.2 The MS recoveries for the following analytes in the associated sample numbers WAI-LF05-SD02, WAI-LF05-S04-1.5 and WAI-BKGD-S01 fell outside the established QC limits of 75-125%:

Analyte	%Recovery	Bias
Antimony	56	Low
Manganese	477	High

Due to the above noted deviations in MS recoveries for antimony and manganese, all detected results and sample quantitation limits for the above noted analytes are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

The MS recovery for barium marginally fell outside the QC limits, therefore, it is the opinion of the reviewer that the deviation in MS recovery for barium has no adverse effect on the data quality.

The non-detected results for antimony in all project samples may be false negatives.

The detected results for manganese in all project samples may be biased high.

J.3 The MS recoveries for aluminum and iron in the above MS analyses were outside the advisory QC limits. However, the sample concentration exceeded the spike concentration by a factor of four or more for the above noted target analytes. Therefore, data are not qualified on the basis of the deviations in MS recoveries.

J.4 Due to above noted deviations in MS recoveries (see J.1-J.3), post-digestion spike recovery analyses were performed on September 10 and 20, 1993. The recovery results for all post-digestion spike analyses met applicable QC criteria.

J.5 All other applicable QC criteria were met for the MS analyses and the results are considered acceptable.

K. Quantitation:

K.1 No problems were observed with analyte quantitation in project sample analyses.

L. Conclusion:

L.1 Due to above noted deficiencies in matrix spike analyses, select data are considered rejected and unusable for any purpose.

L.2 Due to above noted deficiencies in continuing calibration, laboratory replicate and matrix spike analyses, select data are

considered estimates and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Wainwright RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Sharon Lin, ICF Kaiser Engineers, Inc.
ANALYSIS: Total & Dissolved Metals by USEPA Method 6010 &
Total & Dissolved Thallium by USEPA Method 7841
MATRIX: Soil & Water
DATE: February 4, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received two (2) water samples and one (1) soil sample for total and dissolved metals analyses by USEPA Methods 6010 and 7841 on August 31, 1993. The samples were digested on September 8, 1993 and analyzed for total and dissolved metals by inductively coupled plasma atomic emission spectroscopy (ICP) and for total and dissolved thallium by atomic absorption furnace technique (GFAA) on September 8 through 21, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS09-S06	4483-8	Soil
WAI-EB-02	4483-9	Water
WAI-SS09-SW01	4483-10	Water
WAI-SS09-SW01 (F)	4483-10	Water

Sample number WAI-EB-02 was designated as an "equipment blank."

Sample number WAI-SS09-SW01 (F) was designated as a field-filtered sample and analyzed for dissolved metals and thallium.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," October 1989, USEPA Method 6010, USEPA Method 7841, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 Initial calibration QC criteria were met for project sample analyses and the results are considered acceptable.

C. Continuing Calibrations:
C.1 Percent recovery for potassium in the continuing calibration verification (CCV) check associated with sample number WAI-SS09-S06 was 81%, falling outside the advisory QC criteria of 90-110%. Therefore, the detected result for potassium in the above noted sample is considered as an estimate (J) and usable for limited purposes only (see modified sample data sheets).

C.2 All other QC criteria were met for continuing calibration analyses and the results are considered acceptable.

D. Laboratory Blank Analyses:
D.1 No target analytes were detected in the method and calibration blanks (initial and continuing calibration blanks) above the Practical Quantitation Limit (PQL) and the results are considered acceptable.

E. Field Blanks:
E.1 No target analytes were detected in the equipment blank WAI-EB-02 and the results are considered acceptable.

F. Field Duplicate Analysis:
F.1 There were no field duplicate analyses included in the project documentation.

G. Laboratory Replicate Analysis:
G.1 There were no laboratory replicate analysis performed for the listed project samples.

H. ICP Interference Check Sample (ICS) Analyses:
H.1 All applicable QC criteria were met for the ICS analyses and the results are considered acceptable.

I. Laboratory Control Sample (LCS) Analyses:
I.1 All laboratory control sample analyses associated with project samples met applicable QC criteria and the results are considered acceptable.

J. Matrix Spike (MS) Analysis:
J.1 The MS recovery for silver in the MS associated with sample number WAI-SS09-S06 was 0%, falling outside the established QC limits of 75-125%. Therefore, the non-detected result for silver

in the above noted sample is considered rejected (R) and unusable for any purpose (see modified sample data sheets).

J.2 The MS recoveries for the following analytes in the MS associated with sample number WAI-SS09-S06 fell outside the established QC limits of 75-125%:

Analyte	%Recovery	Bias
Antimony	56	Low
Barium	68	Low
Magnesium	166	High
Manganese	425	High

Due to above noted deviations in MS recoveries, all sample results for the above noted analytes are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

The non-detected result for antimony in the above noted sample may be a false negative. The detected result for barium in the above noted sample may be biased low.

The detected results for magnesium and manganese may be biased high.

J.3 The MS recoveries for aluminum and iron in the above noted MS analyses were outside the advisory QC limits. However, the sample concentration exceeded the spike concentration by a factor of four or more for the above noted target analytes. Therefore, data are not qualified on the basis of the deviations in MS recoveries.

J.4 Due to above noted deviations in MS recoveries (see J.1-J.3), post-digestion spike recovery analyses were performed on September 20, 1993. The recovery results for all post-digestion spike analyses met applicable QC criteria.

J.5 All other applicable QC criteria were met for the MS analyses and the results are considered acceptable.

K. Quantitation:

K.1 No problems were observed with analyte quantitation in project sample analyses.

L. Conclusion:

L.1 Due to above noted deficiencies in matrix spike analyses, select data are considered rejected and unusable for any purpose.

L.2 Due to above noted deficiencies in continuing calibration, laboratory replicate and matrix spike analyses, select data are considered estimates and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATE: July 22, 1994

TO: John Frerich

FROM: Tim Vonnahme

SUBJECT: Remaining Chain-of-Custody Records from Friedman & Bruya

Enclosed are the remaining chain-of-custody records and associated data summary forms from Cape Lisburne. The results for these nine C-O-C's **have** been validated.

Cape Lisburne

C-O-C	563	C-O-C	577
C-O-C	565	C-O-C	596
C-O-C	570	C-O-C	614
C-O-C	572	C-O-C	615
C-O-C	573		

Enclosed are the chain-of-custody records and associated data summary forms from Oliktok Point and Point Lonely. The results have **not** been validated, but checked for correct quantitation only.

Point Lonely

C-O-C	0416	C-O-C	0431
C-O-C	0417	C-O-C	0442
C-O-C	0418	C-O-C	0443
C-O-C	0419	C-O-C	0444
C-O-C	0420	C-O-C	0445
C-O-C	0421	C-O-C	0446
C-O-C	0422	C-O-C	0482
C-O-C	0423	C-O-C	0483
C-O-C	0424	C-O-C	0486
C-O-C	0425	C-O-C	0487
C-O-C	0426	C-O-C	0588

<u>Oliktok Point</u>

C-O-C	0522	C-O-C	0530
C-O-C	0523	C-O-C	0534
C-O-C	0526	C-O-C	0579
C-O-C	0527	C-O-C	0580
C-O-C	0528	C-O-C	0582

All diesel, PCBs, and pesticides results for water samples submitted before May 15, 1994 need to have the following PQL changes:

1 - For Diesel, change the PQL from 2500 ppb to 1000 ppb.

2 - For PCBs, change the PQL from 5 ppb to 2 ppb.

3 - For Pesticides, change the PQL from 0.5 ppb to 0.2 ppb.

cc: Keith Strout
Clyde Hedin

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Diesel by EPA Method 8015M
MATRIX: Soil
DATE: May 5, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 463) for diesel analysis by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on August 31 and September 2, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-ST02-S01	1210	Soil
WAI-ST02-S02	1212	Soil
WAI-ST02-S03	1214	Soil
WAI-ST02-S04	1216	Soil
WAI-ST02-S05	1218	Soil
WAI-ST02-S06	1220	Soil
WAI-LF05-S01-1	1222	Soil
WAI-LF05-S02-1	1224	Soil
WAI-LF05-S03-1	1226	Soil
WAI-LF05-S04-1.5	1228	Soil
WAI-LF05-S07-1	1230	Soil
WAI-LF05-SD01	1232	Soil
WAI-LF05-SD02	1234	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-ST02-S03 and WAI-ST02-S06 were designated as field replicates, and sample

numbers WAI-LF05-S03-1 and WAI-LF05-S07-1 were also designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for diesel soil project samples were higher than those specified in the Project Sampling and Analysis Plan. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a 3 point initial calibration on GC instrument ICF6 on August 29, 1993. The range of the initial calibration was from 100 ppm to 10,000 ppm. Due to the sensitivity present at the 100 ppm initial calibration standard, the practical quantitation limit (PQL) of 50 ppm does not need to be raised to the low point of this initial calibration (100 ppm). All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 9.04 was calculated using calibration factors determined from the initial calibration, and is within the recommended QC limit of 20.0%. However, since this is only a three point initial calibration curve, all detected results are qualified "J" as estimated and usable for limited purposes..

C. Continuing Calibration:

C.1 One continuing calibration standard (File 098F2801) exceeded the QC criteria of 75-125% recovery with a reported value of 128%. The detected results and the practical quantitation limit (PQL) for the method blank and the matrix spike/matrix spike duplicate QC samples associated with this continuing calibration standard are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blank analyses associated with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-ST02-S03 and WAI-ST02-S06 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

G.3 Samples WAI-LF05-S03-1 and WAI-LF05-S07-1 were also utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-LF05-S04-1.5 was used for the matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 The method blank and QC samples were reanalyzed due to instrument problems with the initial GC analysis.

J.2 No other problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 The laboratory reported a detected result of 190 ppm for diesel in sample duplicate WAI-LF05-S04-1.5, whereas no diesel was detected in the original sample. It is the opinion of the reviewer that the submitted chromatogram does not support the presence of diesel in the sample. Therefore, the detected result for diesel in the duplicate sample has been changed on the data summary form by the reviewer to reflect that diesel was not detected at a concentration above the PQL.

K.2 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was not detected at concentrations above the PQL in the method blank and the samples.

L.2 Due to only a 3 point initial calibration, and one continuing calibration standard outside the QC criteria, all detected results and the PQLs for the method blank and associated QC samples are qualified "J" as estimated and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Diesel by EPA Method 8015M
MATRIX: Water and Soil
DATE: April 29, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 7, 1993 (referenced chain of custody record No. 447). Seven of the samples were requested for diesel analyses by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 8, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-2SW02	1870	Water
WAI-BKGD-2SD02	1874	Soil
WAI-BKGD-2S02	1876	Soil
WAI-SS04-2S07	1877	Soil
WAI-SS04-2S08	1878	Soil
WAI-SS09-2SW02	1882	Water
WAI-SS09-2SD02	1884	Soil

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for diesel water and soil project samples were higher than those specified in the Project Sampling and Analysis Plan. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets

submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a 3 point initial calibration on GC instrument ICF6 on September 9, 1993. The range of the initial calibration was from 100 ppm to 10,000 ppm. Due to the sensitivity present at the 100 ppm initial calibration standard, the practical quantitation limit (PQL) of 50 ppm does not need to be raised to the low point of this initial calibration (100 ppm). A percent relative standard deviation (%RSD) of 44.5% was calculated using calibration factors determined from the initial calibration. The laboratory did not correctly quantitate the three initial calibration standards, causing the high percent RSD. Since this is only a three point initial calibration curve, and the %RSD is outside the QC criteria, all detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 Two out of three continuing calibrations standards also exceeded the QC criteria of 75-125% recovery due to an incorrect baseline causing artificially high diesel area counts. Only one continuing calibration standard (File 098F0201) was integrated correctly. All method blanks and samples will be referenced to this calibration standard. The PQL for all method blanks and samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicate samples submitted for analysis with this project sample set.

H. Surrogate Recoveries:

H.1 All surrogate recoveries were referenced to continuing calibration standard 098F0201.

H.2 Sample WAI-BKGD-2SD02, when calculated by the reviewer (164%) exceeded the QC criteria of 50-150%. All detected results for this sample are qualified "J" as estimated and usable for limited purposes.

H.3 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS04-2S07 was used for the soil matrix spike/matrix spike duplicate analyses, and sample number TW (tap water) was used for the water matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 The initial calibration and two continuing calibration standards were incorrectly quantitated by the laboratory. The baseline generated by the instrument software was not properly set, and no corrected quantitation reports were submitted by the laboratory after repeated requests by the reviewer. Therefore, all detected results and the PQL for the samples associated with the above continuing calibration standards are qualified "J" as estimated and usable for limited purposes.

K.2 A discrepancy exists between the detected result of 600 ppm reported by the laboratory and the result of 750 ppm regenerated by the reviewer for sample WAI-SS04-2S08. The discrepancy is probably due to inconsistent quantitation procedures performed by the laboratory.

K.3 The results for three of the soil samples were not correctly adjusted for moisture content by the laboratory. The adjusted results have been reported on the summary results page by the reviewer.

K.4 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was detected in sample WAI-SS04-2S08 at concentrations of 750 ppm as calculated by the reviewer.

L.2 Due to a large %RSD and incorrect quantitation of the initial calibration, along with incorrect quantitation for two of the continuing calibrations for diesel, all

detected results and the PQL for selected project samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-D512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Diesel by EPA Method 8015M
MATRIX: Water and Soil
DATE: May 22, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil samples and 1 water sample from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 472) for diesel analysis by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 2 and 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-S01	1478	Soil
WAI-SS04-S02	1480	Soil
WAI-SS04-S03	1482	Soil
WAI-SS04-S04	1484	Soil
WAI-SS04-S05	1486	Soil
WAI-SS04-S06	1488	Soil
WAI-SS09-SD01	1490	Soil
WAI-SS09-S01	1492	Soil
WAI-SS09-S02-2.5	1494	Soil
WAI-SS09-S03	1496	Soil
WAI-EB-02	1498	Water
WAI-SS09-S04	1502	Soil
WAI-SS09-S05	1504	Soil
WAI-SS09-S06	1506	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-SS04-S05 and WAI-SS04-S01 were designated as field replicates, and sample number WAI-EB-02 was designated as an equipment blank.

The analytical results for the soil samples were reported with an adjustment for moisture content. The laboratory reported a percent solid content of 108% for sample WAI-SS04-S03. The moisture content calculation was check by the reviewer on the sample worksheet and was calculated at 108%, therefore, the percent solid is assumed to be 100%.

The quantitation limits reported by the laboratory for the water sample (200 ppb) was lower than those specified in the Project Sampling and Analysis Plan (500 ppb). However, since the low point of the initial calibration is 50 ppm, the PQL should be 1000 ppb. The PQL has been adjusted on the data summary form by the reviewer.

The quantitation limits reported by the laboratory for the soil samples (50 ppm) were higher than those specified in the Project Sampling and Analysis Plan (10 ppm). Since the low point of the initial calibration is 50 ppm, the PQL should be 50 ppm. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a 6 point initial calibration on GC instrument ICF5 on 8/28/93. The attempted range of the initial calibration was from 10 ppm to 10,000 ppm. Due to low sensitivity and interference, the 10 ppm calibration standard was deleted from the calibration. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 41.6% was calculated using calibration factors determined from the initial 5 point calibration. The RSD of 41.6% exceeds the recommended QC criteria of 20.0%, primarily due to the interference in the 50 ppm calibration standard which produced an artificially high calibration factor. A %RSD of 9.8 was obtained using a range of 200 ppm to 10,000 ppm. Since the initial calibration exceeds the recommended QC criteria of 20.0%, the detected results for diesel in the project samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-02 was designated as an equipment blank.

F.2 Diesel was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS04-S05 and WAI-SS04-S01 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recovery reported by the laboratory (126%) and the surrogate recovery calculated by the reviewer (204%) for the tap water blank. The laboratory calculated an average water internal standard area of 41600, which could not be reproduced by the reviewer. The surrogate recoveries were calculated referencing the internal standard of the closest continuing calibration standard by the reviewer. It is the opinion of the reviewer that the error in surrogate recovery is due to incorrect peak area integration.

H.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS07-S01 was used for the soil matrix spike/matrix spike duplicate analyses. The sample was not included on chain-of-custody 472. The laboratory result for the matrix spike duplicate sample could not be verified by the reviewer. It is the opinion of the reviewer that the quality of the data was not affected.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. <u>Quantitation and Identification:</u>

K.1 The surrogate recovery for the TW blank was outside the QC criteria on the high side, therefore any detected results of diesel in this method blank is qualified "J" as estimated and usable for limited purposes.

K.2 Since the low point of the initial calibration was 50 ppm, the project water sample PQL was adjusted to 1000 ppb on the data summary form by the reviewer.

K.3 Diesel was detected in samples WAI-SS04-S01 (1478) at a concentration of 4600 ppm, and sample WAI-SS04-S05 (1486) at a concentration of 4900 ppm.

K.4 No other problems were observed with compound quantitation and identification.

L. <u>Conclusion:</u>

L.1 Diesel was detected in samples WAI-SS04-S01 (1478) at a concentration of 4600 ppm, and sample WAI-SS04-S05 (1486) at a concentration of 4900 ppm.

L.2 Due to problems with the initial calibration, all detected results are qualified "J" as estimated and usable for limited purposes.

L.3 The project water sample PQL was adjusted to 1000 ppb on the data summary forms by the reviewer.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Diesel by EPA Method 8015M
MATRIX:	Water and Soil
DATE:	May 10, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 4 soil and 7 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 471). Five water and four soil samples were requested for diesel analysis by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 2 and 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-SW01	1406	Water
WAI-SS04-SW04	1417	Water
WAI-SS04-SW02	1426	Water
WAI-SS04-SW03	1430	Water
WAI-SS04-SD01	1440	Soil
WAI-SS04-SD02	1434	Soil
WAI-SS04-SD03	1436	Soil
WAI-SS04-SD04	1438	Soil
WAI-SS09-SW01	1444	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS04-SW01 and WAI-SS04-SW04 were designated as field duplicates.

The analytical results for the soil samples were reported with an adjustment for moisture

content.

It should be noted that all quantitation limits reported by the laboratory for diesel soil project samples were higher than those specified in the Project Sampling and Analysis Plan. It is the opinion of the reviewer that the quality of the data was not affected.

The quantitation limits reported by the laboratory for the water samples (200 ppb) were lower than those specified in the Project Sampling and Analysis Plan (500 ppb). Since the low point of the initial calibration is 50 ppm, the PQL should be 1000 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a 6 point initial calibration on GC instrument ICF5 on 8/28/93. The attempted range of the initial calibration was from 10 ppm to 10,000 ppm. Due to low sensitivity and interference, the 10 ppm calibration standard was deleted from the calibration. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 41.6% was calculated using calibration factors determined from the initial 5 point calibration. The RSD of 41.6% exceeds the recommended QC criteria of 20.0%, primarily due to the interference in the 50 ppm calibration standard which produced an artificially high calibration factor. A %RSD of 9.8 was obtained using a range of 200 ppm to 10,000 ppm. Since the initial calibration exceeds the recommended QC criteria of 20.0%, the detected results for diesel in the project samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blank at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analyses with this project sample set.

G. Field Duplicate Analyses:

G.1 A QC limit for precision of ≤20%, as measured by Relative Percent Difference (RPD) between water sample values, was specified for field duplicate comparability.

G.2 Samples WAI-SS04-SW01 and WAI-SS04-SW04 were utilized for field duplicate analysis. The results of the field duplicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 The surrogate recoveries were outside the QC criteria as calculated by the reviewer for the following samples.

ICF Site No.	Laboratory Results	Validation Results
TW Blank	126%	204%
TW MS	117%	188%
TW MSD	108%	188%
WAI-SS04-SW03	94%	164%

The laboratory calculated an average water internal standard area of 41600, which could not be reproduced by the reviewer. The surrogate recoveries were calculated referencing the closest continuing calibration standard by the reviewer. All detected results are qualified "J" as estimated and usable for limited purposes.

H.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS07-S01 was used for the soil matrix spike/matrix spike duplicate analyses. This sample was not included in chain-of-custody record 471. The laboratory result for the matrix spike duplicate sample could not be verified by the reviewer. It is the opinion of the reviewer that the quality of the data was not affected.

I.2 Sample number TW (tap water) was used as the water matrix spike/matrix spike duplicate analyses.

Discrepancies exist between the matrix spike recoveries reported by the laboratory and the recoveries calculated by the reviewer. The recoveries reported by the laboratory and the recoveries calculated by the reviewer are listed below.

ICF Sample No.	Laboratory Recovery	Validation Recovery
WAI-SS07-S01 MS	68%	34%
WAI-SS07-S01-MSD	79%	39%

The analytical results are not qualified solely on the results of the matrix spike and matrix spike duplicate analyses.

I.2 All of the other matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 The surrogate recoveries for the water method blank, sample WAI-SS04-SW03, and the water QC samples were outside the QC criteria, therefore any detected results associated with this method blank and samples are qualified "J" as estimated and usable for limited purposes.

K.2 The matrix spike and matrix spike duplicate results for the water samples were outside the QC criteria. No action is required solely on MS/MSD results.

K.3 The low point in the diesel initial calibration performed on August 28, 1993 was 50 ppm. Therefore, the PQL for diesel in all of the water samples and blanks has been raised from 200 ppb to 1000 ppb.

K.4 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was not detected at concentrations above the PQL in the method blanks and the samples.

L.2 Due to problems with the initial calibration, all detected results are qualified "J" as estimated and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Diesel by EPA Method 8015M
MATRIX:	Water and Soil
DATE:	May 11, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 7 soil and 3 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 468) for diesel analysis by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 2 and 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-SD01	1452	Soil
WAI-SS07-SD02	1454	Soil
WAI-SS07-SD03	1456	Soil
WAI-SS07-SD04	1450	Soil
WAI-SS07-S01	1458	Soil
WAI-SS07-S02	1460	Soil
WAI-SS07-S03	1462	Soil
WAI-SS07-SW01	1464	Water
WAI-SS07-SW02	1468	Water
WAI-SS07-SW03	1474	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS07-S01 and WAI-SS07-S03 were designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The quantitation limits reported by the laboratory for the water samples (200 ppb) were lower than those specified in the Project Sampling and Analysis Plan (500 ppb). However, since the low point of the initial calibration is 50 ppm, the PQL should be 1000 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The quantitation limits reported by the laboratory for the soil samples (50 ppm) were higher than those specified in the Project Sampling and Analysis Plan (10 ppm). Since the low point of the initial calibration is 50 ppm, the PQL should be 50 ppm. It is the opinion of the reviewer that the quality of the data was not affected.

The laboratory reported incorrect ICF ID numbers for samples WAI-SS07-SD01 (1452) and WAI-SS07-S02 (1460). They have been corrected on the data summary forms by the reviewer.

The instrument Number-Sequence Date on the Data Summary Forms for Samples WAI-SS07-SD01, WAI-SS07-SD02 and WAI-SS07-S01 were inadvertently recorded as ICF6 09-03-93 instead of ICF-5 09-01-93.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a 6 point initial calibration on GC instrument ICF5 on 8/28/93. The attempted range of the initial calibration was from 10 ppm to 10,000 ppm. Due to low sensitivity and interference, the 10 ppm calibration standard was deleted from the calibration. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 41.6% was calculated using calibration factors determined from the initial 5 point calibration. The RSD of 41.6% exceeds the recommended QC criteria of 20.0%, primarily due to the interference in the 50 ppm calibration standard which produced an artificially high calibration factor. A %RSD of 9.8 was obtained using a range of 200 ppm to 10,000 ppm. Since the initial calibration exceeds the recommended QC criteria of 20.0%, the detected results for diesel in the project samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are

considered acceptable.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS07-S01 and WAI-SS07-S03 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recoveries reported by the laboratory and the surrogate recoveries calculated by the reviewer for some of the project samples. The recoveries reported by the laboratory and the recoveries calculated by the reviewer that were outside the QC criteria are listed below.

ICF Site No.	Laboratory Results	Validation Results
WAI-SS07-SW01	95%	166%
WAI-SS07-SW03	88%	154%

The laboratory calculated an average water internal standard area of 41600, which could not be reproduced by the reviewer. The surrogate recoveries were calculated referencing the internal standard of the closest continuing calibration standard by the reviewer.

H.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS07-S01 was used for the soil matrix spike/matrix spike duplicate analyses. The laboratory result for the matrix spike duplicate sample could not be verified by the reviewer. It is the opinion of the reviewer that the quality of the data was not affected. No water matrix spike/matrix spike duplicate analyses were performed by the laboratory.

J. Syst emPerformance:

J.1 Due to the high levels of diesel in selected samples, numerous instrument blanks were analyzed between the high level samples.

J.2 No other problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 The surrogate recoveries for samples WAI-SS07-SW01 and WAI-SS07-SW03 were outside the QC criteria on the high side, therefore any detected results of diesel in these samples are qualified "J" as estimated and usable for limited purposes.

K.2 Since the low point of the initial calibration was 50 ppm, all project water sample PQLs were adjusted to 1000 ppb on the data summary forms by the reviewer.

K.3 Diesel was detected in samples WAI-SS07-S01 at a concentration of 6500 ppm, WAI-SS07-S02 at a concentration of 570 ppm, and WAI-SS07-S03 at a concentration of 8300 ppm. All three samples appeared to also contain contamination from lube oil, resulting in reported values biased slightly higher than the actual amount.

K.4 The laboratory inadvertently reported 200 ppb diesel in sample WAI-SS07-SW01. The correct value of <1000 ppb has been adjusted on the data summary form by the reviewer.

K.5 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was detected in samples WAI-SS07-S01 at a concentration of 6500 ppm, WAI-SS07-S02 at a concentration of 570 ppm, and WAI-SS07-S03 at a concentration of 8300 ppm. All three samples appeared to also contain contamination from lube oil, resulting in reported values biased slightly higher than normal.

L.2 Due to problems with the initial calibration, all detected results are qualified "J" as estimated and usable for limited purposes.

L.3 All project water sample PQLs were adjusted to 1000 ppb on the data summary forms by the reviewer.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Clyde Hedin
ANALYSIS:	Diesel by EPA Method 8015M
MATRIX:	Water and Soil
DATE:	May 25, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 7 soil samples and 2 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 462) for diesel analysis by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on August 31, September 2, and September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-S01	1236	Soil
WAI-BKGD-SD01	1238	Soil
WAI-SS08-SD01	1240	Soil
WAI-SS08-SD02	1242	Soil
WAI-SS08-SD03	1244	Soil
WAI-SS08-SD04	1246	Soil
WAI-SS08-SD05	1248	Soil
WAI-LF05-SW02	1250	Water
WAI-LF05-SW01	1256	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS08-SD04 and WAI-SS08-SD05 were designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The quantitation limits reported by the laboratory for the water samples (200 ppb) were lower than those specified in the Project Sampling and Analysis Plan (500 ppb). However, since the low point of the initial calibration is 50 ppm, the PQL should be 1000 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The quantitation limits reported by the laboratory for the soil samples (50 ppm) were higher than those specified in the Project Sampling and Analysis Plan (10 ppm). Since the low point of the initial calibration is 50 ppm, the PQL should be 50 ppm. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a 6 point initial calibration on GC instrument ICF5 on 8/28/93. The attempted range of the initial calibration was from 10 ppm to 10,000 ppm. Due to low sensitivity and interference, the 10 ppm calibration standard was deleted from the calibration. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 41.6% was calculated using calibration factors determined from the initial 5 point calibration. The RSD of 41.6% exceeds the recommended QC criteria of 20.0%, primarily due to the interference in the 50 ppm calibration standard which produced an artificially high calibration factor. A %RSD of 9.8 was obtained using a range of 200 ppm to 10,000 ppm. Since the initial calibration exceeds the recommended QC criteria of 20.0%, the detected results for diesel in the project samples are qualified "J" as estimated and usable for limited purposes.

B.2 The laboratory performed a 3 point initial calibration on GC instrument ICF6 on August 29, 1993. The range of the initial calibration was from 100 ppm to 10,000 ppm. Due to the sensitivity present at the 100 ppm initial calibration standard, the practical quantitation limit (PQL) of 50 ppm does not need to be raised to the low point of this initial calibration (100 ppm). All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 9.04 was calculated using calibration factors determined from the initial calibration, which is within the recommended QC limit of 20.0%. However, since this is only a three point initial calibration curve, all detected results are qualified "J" as estimated and usable for limited purposes.

C. Cont inuingCalibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blanks at concentrations above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at concentrations above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS08-SD04 and WAI-SS08-SD05 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 Discrepancies exist between the surrogate recoveries reported by the laboratory and the surrogate recoveries regenerated by the reviewer for the project samples listed below. The reviewer calculated the recoveries using the average surrogate area from the continuing calibration standard.

ICF Site No.	Laboratory % Recovery	Validation % Recovery
Tap Water Blank	117	204
Tap Water MS	110	188
Tap Water MSD	117	188

Surrogate recovery discrepancies are probably due to inconsistent quantitation procedures performed by the laboratory.

H.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample WAI-BKGD-SD01 was analyzed as the soil matrix spike/matrix spike duplicate (MS/MSD) for chain of custody 462. The reviewer could not use the areas from the quantitation reports to determine MS/MSD recoveries because the samples were improperly integrated by the laboratory. Although unable to verify MS/MSD response using peak areas, determination of MS/MSD response using peak heights

revealed the recoveries were acceptable. Tap water samples were used and reported by the laboratory for the water matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 Surrogate recoveries for the TW blank, TW matrix spike, and TW matrix spike duplicate exceeded the QC criteria.

K.2 Since the low point of the initial calibration was 50 ppm, the PQL of the water samples were adjusted to 1000 ppb on the data summary forms by the reviewer.

K.3 Discrepancies exist between the sample PQLs reported by the laboratory and those regenerated by the reviewer for the project samples listed below. The soil samples are reported in ppm and the water samples in ppb.

ICF Site No.	Laboratory Reported Results	Reviewer Recalculated Results
WAI-SS08-SD01	< 90	< 81
WAI-SS08-SD02	< 130	< 74
WAI-SS08-SD03	< 190	< 135
WAI-SS08-SD04	< 220	< 120
WAI-SS08-SD05	< 270	< 180
WAI-BKGD-S01 MBLK	< 200	< 50
WAI-BKGD-S01 DUP	< 50	< 51
WAI-LF05-SW02	< 200	< 1000
WAI-LF05-SW01	< 200	< 1000
Method Blank	< 200	< 1000

The laboratory indicated that discrepancies are probably due to inconsistent calculation procedures used to correct soil sample PQLs for percent moisture. The laboratory was unable to reproduce some of the reported PQLs which indicates that inconsistent calculation procedures may have been used. The water sample PQL was raised for reasons described in section B.1.

K.4 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was not detected at concentrations above the PQLs in the method blanks or the samples.

L.2 Due to problems with the initial calibration, the detected results for the project samples are qualified "J" as estimated and usable for limited purposes.

L.3 The PQLs of the project water samples were adjusted to 1000 ppb on the data summary forms by the reviewer.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Diesel by EPA Method 8015M
MATRIX:	Water
DATE:	May 11, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 6 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 466) for diesel analysis by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS08-SW02	1262	Water
WAI-SS08-SW01	1267	Water
WAI-SS08-SW03	1271	Water
WAI-SS08-SW04	1275	Water
WAI-EB-01	1280	Water
WAI-BKGD-SW01	1284	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS08-SW03 and WAI-SS08-SW04 were designated as field duplicates, and sample number WAI-EB-01 was designated as an equipment blank.

The quantitation limits reported by the laboratory for the water samples (200 ppb) were lower than those specified in the Project Sampling and Analysis Plan (500 ppb). Since the low point of the initial calibration is 50 ppm, the practical quantitation limit (PQL) should be 2500 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a 6 point initial calibration on GC instrument ICF5 on 8/28/93. The attempted range of the initial calibration was from 10 ppm to 10,000 ppm. Due to low sensitivity and interference, the 10 ppm calibration standard was deleted from the calibration. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 41.6% was calculated using calibration factors determined from the initial 5 point calibration. The RSD of 41.6% exceeds the recommended QC criteria of 20.0%, primarily due to the interference in the 50 ppm calibration standard which produced an artificially high calibration factor. A %RSD of 9.8 was obtained using a range of 200 ppm to 10,000 ppm. Since the initial calibration exceeds the recommended QC criteria of 20.0%, the detected results for diesel in the project water samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-01 was designated as an equipment blank.

F.2 Diesel was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analyses:

G.1 A QC limit for precision of ≤20%, as measured by Relative Percent

Difference (RPD) between water sample values, was specified for field duplicate comparabilityD.

G.2 Samples WAI-SS08-SW03 and WAI-SS08-SW04 were utilized for field duplicate analysis. The results of the field duplicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 The surrogate recoveries were outside the QC criteria as calculated by the reviewer for the following samples:

ICF Site No.	Laboratory Results	Validation Results
TW Blank	117%	204%
TW MS	110%	188%
TW MSD	117%	188%

The laboratory calculated an average water internal standard area of 41600, which could not be reproduced by the reviewer. The surrogate recoveries were calculated referencing the internal standard of the closest continuing calibration standard by the reviewer.

H.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number TW (tap water) was used as the water matrix spike/matrix spike duplicate analyses. It was not listed on the chain-of-custody record 0466.

Discrepancies exist between the matrix spike recoveries reported by the laboratory and the recoveries calculated by the reviewer. The recoveries reported by the laboratory and the recoveries calculated by the reviewer are listed below.

ICF Sample No.	Laboratory Recovery	Validation Recovery
TW MS	68%	34%
TW MSD	79%	39%

The analytical results are not qualified solely on the results of the matrix spike analyses.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 The surrogate recoveries for the method blank and associated QC samples were outside the QC criteria, therefore, the detected results and the PQLs for these samples are qualified "J" as estimated and usable for limited purposes.

K.2 The matrix spike and matrix spike duplicate results for the water samples were outside the QC criteria. No action is required solely on MS/MSD results.

K.3 Since the low point of the initial calibration was 50 ppm, all project sample PQLs were adjusted to 1000 ppb on the data summary forms by the reviewer.

K.4 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was not detected at a concentration above the PQL in the method blank and the samples.

L.2 Due to problems with the initial calibration and surrogate recoveries, all detected results are qualified "J" as estimated and usable for limited purposes.

L.3 The PQL in all project samples were adjusted to 1000 ppb on the data summary forms by the reviewer.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Diesel by EPA Method 8015M
MATRIX:	Water and Soil
DATE:	May 3, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 8, 1993 (referenced chain of custody record No. 454). All of the samples were requested for diesel analyses by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-2SW04	1888	Water
WAI-SS07-2SW05	1889	Water
WAI-SS07-2SW06	1890	Water
WAI-SS07-2SD05	1891	Soil
WAI-SS07-2SD06	1892	Soil
WAI-EB-03	1894	Water
WAI-SS09-2S07	1898	Soil
WAI-STKP-S01	1900	Soil
WAI-STKP-S02	1902	Soil

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for diesel soil project samples were higher than those specified in the Project Sampling and Analysis Plan. It is the opinion of the reviewer that the quality of the data was not affected.

The quantitation limits reported by the laboratory for the water samples (1000 ppb) were higher than those specified in the Project Sampling and Analysis Plan (500 ppb). Since the low point of the initial calibration is 50 ppm, the PQL should be 2500 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The following QC sample designations were included in project documentation: sample numbers WAI-SS07-2SW04 and WAI-SS07-2SW06 were designated as field duplicate samples, and sample number WAI-EB-03 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a 3 point initial calibration on GC instrument ICF6 on September 9, 1993. The range of the initial calibration was from 100 ppm to 10,000 ppm. Due to the sensitivity present at the 100 ppm initial calibration standard, the practical quantitation limit (PQL) of 50 ppm does not need to be raised to the low point of this initial calibration (100 ppm). A percent relative standard deviation (%RSD) of 44.5% was calculated using calibration factors determined from the initial calibration. The laboratory did not correctly quantitate the three initial calibration standards, causing the high percent RSD. Since this is only a three point initial calibration curve, and the %RSD is outside the QC criteria, all detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 Two out of three continuing calibration standards also exceeded the QC criteria of 75-125% recovery due to an incorrect baseline causing artificially high diesel area counts. Only one continuing calibration standard (File 098F0201) was integrated correctly. All method blanks and samples will be referenced to this calibration standard. The PQL for all method blanks and samples associated with these two continuing calibration standards are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-03 was designated as an equipment blank.

F.2 Diesel was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analyses:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field duplicate comparability.

G.2 Samples WAI-SS07-2SW04 and WAI-SS07-2SW06 were utilized for field duplicate analysis. The results of the field duplicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries calculated by the reviewer were referenced to continuing calibration standard 098F0201.

H.2 The surrogate recoveries reported by the laboratory could not be verified by the reviewer. However, since recoveries calculated by the laboratory and the reviewer both met the QC criteria, no action was taken.

H.3 Ther surrogate recovery for sample WAI-SS07-2SD05 was calculated by the reviewer using peak height because the surrogate area contained hydrocarbon interference.

H.4 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS04-2S07 was used for the soil matrix spike/matrix spike duplicate analyses, and sample number TW (tap water) was used for the water matrix spike/matrix spike duplicate analyses. These samples were not submitted on chain of custody record No. 454.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 The initial calibration and two continuing calibration standards were

incorrectly quantitated by the laboratory. The baseline generated by the instrument software was not properly set, and no corrected quantitation reports were submitted by the laboratory after repeated requests by the reviewer. Therefore, all detected results and the PQL for the samples associated with the above continuing calibration standards are qualified "J" as estimated and usable for limited purposes.

K.2 The laboratory reported a detected result for diesel in sample WAI-SS07-2SD05 and indicated that the detected result may be due to hydraulic fluid. It is thee opinion of the reviewer that the detected peaks in this sample are probably due to higher molecular weight hydrocarbons including hydraulic fluid. Therefore, the detected result for diesel in this sample is qualified "J" as estimated and usable for limited purposes.

K.3 The PQL for two of the soil samples were not correctly adjusted for moisture content by the laboratory. The adjusted PQLs have been reported on the data summary forms by the reviewer.

K.4 The PQLs for the water samples have been raised to 2500 ppm because the low point of the initial calibration was 50 ppm.

K.5 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was not detected at concentrations above the PQL in the method blanks and the samples.

L.2 The laboratory reported hydraulic fluid at a concentration of 120,000 ppm in sample WAI-SS07-2SD05. No dilution was performed by the laboratory.

L.3 Due to a large %RSD and incorrect quantitation of the initial calibration, along with incorrect quantitation for two of the continuing calibrations for diesel, all detected results and the PQL for selected project samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	Gasoline by USEPA Method 8015M
MATRIX:	Soil
DATE:	May 2, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 13 soil samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 463) for gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 3 through September 6, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-ST02-S01	1210	Soil
WAI-ST02-S02	1212	Soil
WAI-ST02-S03	1214	Soil
WAI-ST02-S04	1216	Soil
WAI-ST02-S05	1218	Soil
WAI-ST02-S06	1220	Soil
WAI-LF05-S01-1	1222	Soil
WAI-LF05-S02-1	1224	Soil
WAI-LF05-S03-1	1226	Soil
WAI-LF05-S04-1.5	1228	Soil
WAI-LF05-S07-1	1230	Soil
WAI-LF05-SD01	1232	Soil
WAI-LF05-SD02	1234	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-ST02-S03 and WAI-ST02-S06 were designated as field replicates, and sample numbers WAI-LF05-S03-1 and WAI-LF05-S07-1 were also designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 3-4 on August 24, 1993. The range of the initial calibration was from 100 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 27.4 was calculated using calibration factors determined from the initial calibration. The 27.4% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the project samples are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blank analyses associated with this project sample set.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-ST02-S03 and WAI-ST02-S06 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

G.3 Samples WAI-LF05-S03-1 and WAI-LF05-S07-1 were also utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The low point in the gasoline initial calibration performed on August 24, 1994 was 100 ppb. Therefore, the PQL for gasoline in all of the samples and blanks has been raised from 1 ppm to 2 ppm.

K.2 A discrepancy exists between the detected result reported by the laboratory (90 ppm) and the result regenerated by the reviewer (200 ppm) for sample number WAI-LF05-S04-1.5. The laboratory indicated that the discrepancy is probably due to inconsistent quantitation procedures. The laboratory was unable to reproduce some of the reported detected results for gasoline which indicates that inconsistent quantitation procedures may have been used.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 The low point in the gasoline initial calibration performed on August 24, 1994 was 100 ppb. Therefore, the PQL for gasoline in all of the samples and blanks has been raised from 1 ppm to 2 ppm.

L.2 Due to the large percent RSD in the initial calibration and the lack of continuing calibrations for the gasoline fraction, the detected results and the PQL for gasoline in all project samples and blanks are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Keith Strout
ANALYSIS: Gasoline by USEPA Method 8015M
MATRIX: Water and Soil
DATE: May 17, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 13 soil samples and 1 water sample from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 472). All of the samples required gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 3 and September 4, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-S01	1478	Soil
WAI-SS04-S02	1480	Soil
WAI-SS04-S03	1482	Soil
WAI-SS04-S04	1484	Soil
WAI-SS04-S05	1486	Soil
WAI-SS04-S06	1488	Soil
WAI-SS09-SD01	1490	Soil
WAI-SS09-S01	1492	Soil
WAI-SS09-S02-2.5	1494	Soil
WAI-SS09-S03	1496	Soil
WAI-EB-02	1500	Water
WAI-SS09-S04	1502	Soil
WAI-SS09-S05	1504	Soil
WAI-SS09-S06	1506	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-SS04-S05 and WAI-SS04-S01 were designated as field replicates, and sample number WAI-EB-02 was designated as an equipment blank.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 50 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 31.8 was calculated using calibration factors determined from the initial calibration. The 31.8% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples analyzed on system 1-2 are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory analyzed a four point initial calibration on system 3-4 on August 24, 1993. The range of the initial calibration was from 100 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 27.4 was calculated using calibration factors determined from the initial calibration. The 27.4% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples analyzed on system 3-4 are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the

FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-02 was designated as an equipment blank.

F.2 Gasoline was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS04-S05 and WAI-SS04-S01 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 Discrepancies exist between the surrogate recoveries reported by the laboratory and the surrogate recoveries regenerated by the reviewer for sample numbers WAI-SS04-S01 and WAI-SS04-S05. Listed below are the surrogate recoveries reported by the laboratory and the surrogate recoveries calculated by the reviewer.

ICF Site No.	Laboratory % Recovery	Validation % Recovery
WAI-SS04-S01	83	158
WAI-SS04-S05	89	169

The high surrogate recoveries in these two samples are probably due to interference from gasoline in the samples. This is not expected to have an effect on the gasoline

results for the project samples.

H.2 The surrogate QC recovery criteria were met for all other project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 The FID detector on system 3-4 was not operating during the analysis of the project soil samples.

J.2 No other problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The FID detector on system 3-4 was not operating during the analysis of the project soil samples. Detected results and the PQL for gasoline in these samples were reported using the PID detector. Therefore, the PQL for gasoline in sample numbers WAI-SS09-S03, WAI-SS04-S02, WAI-SS04-S03, WAI-SS04-S06, WAI-SS09-SD01, WAI-SS09-S01, WAI-SS09-S02-2.5, WAI-SS09-S04, WAI-SS09-S05, and WAI-SS09-S06 is qualified "J" as estimated, and the detected results for gasoline in sample numbers WAI-SS04-S01, WAI-SS04-S05, and WAI-SS04-S04 are qualified "NJ" as estimated, and the PQL and detected results for these samples are usable for limited purposes.

K.2 Discrepancies exist between the detected results reported by the laboratory and the results regenerated by the reviewer for sample numbers WAI-SS04-S01, WAI-SS04-S05, and WAI-SS04-S04. Listed below are the results reported by the laboratory and the results calculated by the reviewer for these samples. The results are in parts per million (ppm).

ICF Site No.	Laboratory Results	Validation Results
WAI-SS04-S01	100	120
WAI-SS04-S05	100	120
WAI-SS04-S04	10	14

It appears that the laboratory did not correct the results for the moisture content of the samples. The results have been corrected on the data summary forms.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Due to the large percent RSDs in the initial calibrations and the lack of continuing calibrations, the detected results and the PQL for all project samples and blanks are qualified "J" as estimated and usable for limited purposes.

L.2 Due to problems with the FID detector on system 3-4, the PQL and the detected results in the project soil samples are qualified "J" or "NJ" and are usable for limited purposes.

L.3 Discrepancies exist between the results reported by the laboratory and the results regenerated by the reviewer for some of the project samples. The results have been corrected by the reviewer on the data summary forms.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	Gasoline by USEPA Method 8015M
MATRIX:	Water and Soil
DATE:	May 9, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 4 soil and 7 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 471). All of the samples required gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 3 and September 4, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-SW01	1408	Water
WAI-SS04-SW04	1418	Water
WAI-TB-02	1422	Water
WAI-AB-01	1424	Water
WAI-SS04-SW02	1428	Water
WAI-SS04-SW03	1432	Water
WAI-SS04-SD01	1440	Soil
WAI-SS04-SD02	1434	Soil
WAI-SS04-SD03	1436	Soil
WAI-SS04-SD04	1438	Soil
WAI-SS09-SW01	1446	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS04-SW01 and WAI-SS04-SW04 were designated as field duplicates, sample number WAI-TB-02 was designated as a travel blank, and sample number WAI-AB-01 was designated as an ambient blank.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 50 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 31.8 was calculated using calibration factors determined from the initial calibration. The 31.8% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples analyzed on system 1-2 are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory analyzed a four point initial calibration on system 3-4 on August 24, 1993. The range of the initial calibration was from 100 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 27.4 was calculated using calibration factors determined from the initial calibration. The 27.4% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples analyzed on system 3-4 are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze

for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-TB-02 was designated as a travel blank and sample number WAI-AB-01 was designated as an ambient blank.

F.2 Gasoline was not detected in the travel blank at a concentration above the PQL and the results are considered acceptable.

F.3 Gasoline was not detected in the ambient blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analysis:

G.1 A QC limit for precision of ≤ 20%, as measured by Relative Percent Difference (RPD) between water sample values, was specified for field duplicate comparability.

G.2 Samples WAI-SS04-SW01 and WAI-SS04-SW04 were utilized for field duplicate analysis. The results of the field duplicate analyses, as reported by the laboratory, met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All of the surrogate QC recovery criteria were met and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 The FID detector was not operating during the analysis of samples WAI-SS04-SD02, WAI-SS04-SD03, WAI-SS04-SD01, and WAI-SS04-SD04.

J.2 No other problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The FID detector was not operating during the analysis of samples WAI-SS04-SD02, WAI-SS04-SD03, WAI-SS04-SD01, and WAI-SS04-SD04. Detected results and the PQL for gasoline in these samples were reported using the PID detector. Therefore, the PQL for gasoline in sample numbers WAI-SS04-SD02, WAI-SS04-SD01, and WAI-SS04-SD04 are qualified "J" as estimated, and the detected result for gasoline in sample number WAI-SS04-SD03 is qualified "NJ" as estimated, and the PQL and detected results for these samples are usable for limited purposes.

K.2 The laboratory did not submit the raw data for sample WAI-SS04-SW04. The laboratory has not responded to requests by the reviewer to resubmit raw data which is missing. Therefore, since the reported results for this sample cannot be verified by the reviewer, the PQL for gasoline in this sample is qualified "R" as rejected and unusable.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Due to the large percent RSDs in the initial calibrations and the lack of continuing calibrations, the detected results and the PQL for all project samples and blanks are qualified "J" as estimated and usable for limited purposes.

L.2 Due to missing data, the PQL for gasoline in sample number WAI-SS04-SW04 is qualified "R" as rejected and is unusable.

L.3 Due to problems with the FID detector, select data in some samples are qualified "J" or "NJ" and are usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Keith Strout
ANALYSIS: Gasoline by USEPA Method 8015M
MATRIX: Water and Soil
DATE: May 11, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 7 soil and 3 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 468). All of the samples required gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 3 and September 4, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-SD01	1452	Soil
WAI-SS07-SD02	1454	Soil
WAI-SS07-SD03	1456	Soil
WAI-SS07-SD04	1450	Soil
WAI-SS07-S01	1458	Soil
WAI-SS07-S02	1460	Soil
WAI-SS07-S03	1462	Soil
WAI-SS07-SW01	1466	Water
WAI-SS07-SW02	1470	Water
WAI-SS07-SW03	1474	Water

The following QC sample designations were included in project documentation: sample

numbers WAI-SS07-S01 and WAI-SS07-S03 were designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 50 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 31.8 was calculated using calibration factors determined from the initial calibration. The 31.8% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples analyzed on system 1-2 are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory analyzed a four point initial calibration on system 3-4 on August 24, 1993. The range of the initial calibration was from 100 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 27.4 was calculated using calibration factors determined from the initial calibration. The 27.4% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples analyzed on system 3-4 are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should

have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted with this project sample set.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS07-S01 and WAI-SS07-S03 were utilized for field replicate analysis. The RPD (66%) between the results of the field replicate samples exceed the QC criteria. The FID detector was not functioning at the time of the field replicate analyses and the amount of gasoline in the samples was determined using the PID detector. It is the opinion of the reviewer that this may have an effect on the detected results of gasoline reported by the laboratory.

H. Surrogate Recoveries:

H.1 The surrogate recovery in sample number WAI-SS07-SD01 (45%) exceeded the surrogate recovery QC criteria. Therefore, the PQL for gasoline in this sample is qualified "J" as estimated and is usable for limited purposes.

H.2 The laboratory did not spike the surrogate into sample number WAI-SS07-SD02. Therefore, the PQL for gasoline in this sample is qualified "J" as estimated and is usable for limited purposes.

H.3 The surrogate QC recovery criteria were met for all other project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 The FID detector was not operating during the analysis of samples WAI-SS07-SD01, WAI-SS07-SD02, WAI-SS07-SD03, WAI-SS07-SD04, WAI-SS07-S02, WAI-SS07-S03, and WAI-SS07-S01.

J.2 No other problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The FID detector was not operating during the analysis of samples WAI-SS07-SD01, WAI-SS07-SD02, WAI-SS07-SD03, WAI-SS07-SD04, WAI-SS07-S02, WAI-SS07-S03, and WAI-SS07-S01. Detected results and the PQL for gasoline in these samples were reported using the PID detector. Therefore, the PQL for gasoline in sample numbers WAI-SS07-SD01, WAI-SS07-SD02, WAI-SS07-SD03, and WAI-SS07-SD04 is qualified "J" as estimated, and the detected results for gasoline in sample numbers WAI-SS07-S01, WAI-SS07-S02, and WAI-SS07-S03 are qualified "NJ" as estimated, and the PQL and detected results for these samples are usable for limited purposes.

K.2 The laboratory did not report a detected result for gasoline in sample number WAI-SS07-S01. It is the opinion of the reviewer that gasoline is present in this sample at a concentration of 120 ppm. The detected amount calculated by the reviewer has been entered onto the data summary form.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Due to the large percent RSDs in the initial calibrations and the lack of continuing calibrations, the detected results and the PQL for all project samples and blanks are qualified "J" as estimated and usable for limited purposes.

L.2 Due to problems with the FID detector on system 3-4, select data in some samples are qualified "J" or "NJ" and are usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	Gasoline by USEPA Method 8015M
MATRIX:	Water and Soil
DATE:	May 12, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 7 soil and 3 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 462) for gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 2 and September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-S01	1236	Soil
WAI-BKGD-SD01	1238	Soil
WAI-SS08-SD01	1240	Soil
WAI-SS08-SD02	1242	Soil
WAI-SS08-SD03	1244	Soil
WAI-SS08-SD04	1246	Soil
WAI-SS08-SD05	1248	Soil
WAI-LF05-SW02	1252	Water
WAI-LF05-SW01	1258	Water
WAI-TB-01	1260	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS08-SD04 and WAI-SS08-SD05 were designated as field replicates, and

sample number WAI-TB-01 was designated as a travel blank.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 3-4 on August 24, 1993. The range of the initial calibration was from 100 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 27.4 was calculated using calibration factors determined from the initial calibration. The 27.4% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the project samples are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results

are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-TB-01 was designated as a travel blank.

F.2 Gasoline was not detected in the travel blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS08-SD04 and WAI-SS08-SD05 were utilized for field replicate analysis. The laboratory did not report results for the analysis of sample number WAI-SS08-SD05. During the analysis of the sample, all three detectors exhibited a saturated response. The laboratory did not dilute and reanalyze the sample. However, since there was nothing detected in sample number WAI-SS08-SD04, it appears that these two samples are not identical.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 The FID detector failed during the analysis of sample number WAI-SS08-SD03. The PID detector was used to determine the presence of gasoline in this sample.

J.2 No other problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The low point in the gasoline initial calibration performed on August 24, 1993 was 100 ppb. Therefore, the PQL for gasoline in all of the water samples and blanks has been raised from 50 ppb to 100 ppb, and the PQL for gasoline in all of the soil samples and blanks have been raised from 1 ppm to 2 ppm.

K.2 The laboratory did not report result for the analysis of sample number WAI-SS08-SD05. During the analysis of the sample, all three detectors exhibited a saturated response. The laboratory did not dilute and reanalyze the sample in an attempt to identify the cause of the saturated response. It is possible that the material is of biogenic origin, however, the ECD detector also exhibited a saturated response which suggests that halogenated compounds are present in the sample.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 The low point in the gasoline initial calibration performed on August 24, 1993 was 100 ppb. Therefore, the PQL for gasoline in all of the water samples and blanks has been raised from 50 ppb to 100 ppb, and the PQL for gasoline in all of the soil samples and blanks has been raised from 1 ppm to 2 ppm..

L.2 Due to the lack of continuing calibrations for the gasoline fraction, the PQL for gasoline in all project samples and blanks is qualified "J" as estimated and usable for limited purposes.

L.3 Due to a saturated response on all three detectors, the laboratory did not report results for sample number WAI-SS08-SD05. The reviewer was unable to determine if gasoline was present in the sample.

L.3 Gasoline was not detected in any of the project samples at a concentration above the PQL.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Keith Strout
ANALYSIS: Gasoline by USEPA Method 8015M
MATRIX: Water
DATE: May 10, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 6 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 466) for gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 2 and September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS08-SW02	1264	Water
WAI-SS08-SW01	1268	Water
WAI-SS08-SW03	1272	Water
WAI-SS08-SW04	1276	Water
WAI-EB-01	1282	Water
WAI-BKGD-SW01	1286	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS08-SW03 and WAI-SS08-SW04 were designated as field duplicates, and sample number WAI-EB-01 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This

report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 3-4 on August 24, 1993. The range of the initial calibration was from 100 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 27.4 was calculated using calibration factors determined from the initial calibration. The 27.4% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the project samples are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-01 was designated as an equipment blank.

F.2 Gasoline was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analysis:

G.1 A QC limit for precision of ≤ 20%, as measured by Relative Percent Difference (RPD) between water sample values, was specified for field duplicate comparability.

G.2 Samples WAI-SS08-SW03 and WAI-SS08-SW04 were utilized for field duplicate analysis. The results of the field duplicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The low point in the gasoline initial calibration performed on August 24, 1993 was 100 ppb. Therefore, the PQL for gasoline in all of the samples and blanks has been raised from 50 ppb to 100 ppb.

K.2 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 The low point in the gasoline initial calibration performed on August 24, 1993 was 100 ppb. Therefore, the PQL for gasoline in all of the samples and blanks has been raised from 1 ppm to 2 ppm.

L.2 Due to the lack of continuing calibrations for the gasoline fraction, the PQL for gasoline in all project samples and blanks is qualified "J" as estimated and usable for limited purposes.

L.3 Gasoline was not detected in any of the project samples at a concentration above the PQL.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	Gasoline by USEPA Method 8015M
MATRIX:	Water and Soil
DATE:	April 28, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 7, 1993 (referenced chain of custody record No. 447). Seven of the samples required gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 9 and September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-2SW02	1870	Water
WAI-BKGD-2SD02	1874	Soil
WAI-BKGD-2S02	1876	Soil
WAI-SS04-2S07	1877	Soil
WAI-SS04-2S08	1878	Soil
WAI-SS09-2SW02	1882	Water
WAI-SS09-2SD02	1884	Soil

The laboratory did not submit any raw data or data summary sheets for the gasoline fraction for sample number WAI-SS04-2S08 (1878). The laboratory submitted gasoline data for sample number WAI-TB-03 (1886), therefore, validation was performed on this sample.

The following QC sample designation was included in project documentation: sample number WAI-TB-03 was designated as a travel blank.

The analytical results for soils were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 50 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 31.8 was calculated using calibration factors determined from the initial calibration. The 31.8% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample numbers WAI-TB-03 was designated as a travel blank.

F.2 Gasoline was not detected in the travel blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 There were no field replicate samples associated with this project sample set.

H. Surrogate Recoveries:

H.1 All of the surrogate QC recovery criteria were met for all project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The laboratory did not submit any raw data or data summary sheets for the gasoline fraction for sample number WAI-SS04-2S08 (1878). The laboratory submitted gasoline data for sample number WAI-TB-03 (1886), therefore, validation was performed on this sample.

K.2 The gasoline PQL in sample WAI-BKGD-2SD02 was not adjusted for moisture content by the laboratory. The PQL has been adjusted on the data summary form by the reviewer.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Gasoline was not detected at a concentration above the PQL in any of the project samples.

L.2 Due to a large %RSD in the initial calibration and the lack of continuing calibrations for gasoline, all detected results and the PQL for all project samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	Gasoline by USEPA Method 8015M
MATRIX:	Water and Soil
DATE:	April 29, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 8, 1993 (referenced chain of custody record No. 454). All of the samples required gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 9 and September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-2SW04	1888	Water
WAI-SS07-2SW05	1889	Water
WAI-SS07-2SW06	1890	Water
WAI-SS07-2SD05	1891	Soil
WAI-SS07-2SD06	1892	Soil
WAI-EB-03	1896	Water
WAI-SS09-2S07	1898	Soil
WAI-STKP-S01	1900	Soil
WAI-STKP-S02	1902	Soil

The laboratory did not submit any raw data or data summary sheets for the gasoline fraction for sample numbers WAI-SS07-2SW04 (1878), WAI-SS07-2SW05 (1889), WAI-SS07-2SW06

(1890), WAI-SS07-2SD05 (1891), and WAI-SS07-2SD06 (1892).

The following QC sample designation was included in project documentation: sample number WAI-EB-03 was designated as an equipment blank.

The analytical results for soils were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 50 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 31.8 was calculated using calibration factors determined from the initial calibration. The 31.8% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-03 was designated as an equipment blank.

F.2 Gasoline was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 There were no field replicate samples associated with this project sample set.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recovery reported by the laboratory (76%) and the surrogate recovery calculated by the reviewer (86%) for sample number WAI-SS09-2S07. It appears that the surrogate recovery calculated by the laboratory was transcribed incorrectly from the recovery worksheet to the data summary form. This is not expected to have an affect on the quality of the data because the surrogate recovery QC criteria was met.

H.2 All of the surrogate QC recovery criteria were met for all project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The laboratory did not submit any raw data or data summary sheets for the gasoline fraction for sample numbers WAI-SS07-2SW04 (1878), WAI-SS07-2SW05 (1889), WAI-SS07-2SW06 (1890), WAI-SS07-2SD05 (1891), and WAI-SS07-2SD06 (1892).

K.2 The gasoline PQL in sample number WAI-SS09-2S07 was not adjusted for moisture content by the laboratory. The PQL has been adjusted on the data summary form by the reviewer.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Gasoline was not detected at a concentration above the PQL in any of the project samples.

L.2 Due to a large %RSD in the initial calibration and the lack of continuing calibrations for gasoline, all detected results and the PQL for all project samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX:	Soil
DATE:	May 2, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 13 soil samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 463) to analyze for halogenated volatile organic compounds (HVOCs) and the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed on September 3 through September 6, 1993 for HVOCs by USEPA Method 8010, and the BTEX compounds by USEPA Method 8020.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-ST02-S01	1210	Soil
WAI-ST02-S02	1212	Soil
WAI-ST02-S03	1214	Soil
WAI-ST02-S04	1216	Soil
WAI-ST02-S05	1218	Soil
WAI-ST02-S06	1220	Soil
WAI-LF05-S01-1	1222	Soil
WAI-LF05-S02-1	1224	Soil
WAI-LF05-S03-1	1226	Soil
WAI-LF05-S04-1.5	1228	Soil
WAI-LF05-S07-1	1230	Soil
WAI-LF05-SD01	1232	Soil
WAI-LF05-SD02	1234	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-ST02-S03 and WAI-ST02-S06 were designated as field replicates, and sample numbers WAI-LF05-S03-1 and WAI-LF05-S07-1 were also designated as field replicates.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 3-4 on August 29, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
toluene	26 %
ethylbenzene	53 %
m & p-xylene	41 %
o-xylene	28 %

Due to the large percent RSDs, the detected results for these compounds when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The percent recovery for benzene (66%) in the continuing calibration standard on September 3, 1993 (file No. 039R0101.D) exceeded the percent recovery QC criteria of 75%-125%. Therefore, the detected results and the practical

quantitation limit (PQL) for benzene in the associated blanks and samples is qualified "J" as estimated and is usable for limited purposes.

C.2 All other QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the PQLs and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQLs and the results are considered acceptable.

F. Field Blanks:

F.1 The were no field blanks associated with this project sample set.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-ST02-S03 and WAI-ST02-S06 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

G.3 Samples WAI-LF05-S03-1 and WAI-LF05-S07-1 were also utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 Sample WAI-SS07-S01 was used as the QC sample for the matrix spike/matrix spike duplicate analyses. This sample was not submitted on chain of custody record No. 463.

I.2 Carbon tetrachloride exhibited a high recovery in the matrix spike analysis, and carbon tetrachloride, 1,1,1-trichloroethane, and tetrachloroethene exhibited high recoveries in the matrix spike duplicate analysis. The recoveries of these compounds are listed below.

Analyte	MS % Recovery	MSD % Recovery
carbon tetrachloride	230	280
1,1,1-trichloroethane		170
tetrachloroethene		140

The analytical results are not qualified solely on the results of the matrix spike analyses.

I.3 All other matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 No problems were observed with compound quantitation and identification.

K.2 Compound identification was confirmed using a second column and an alternate detector.

L. Conclusion:

L.1 Due to the high percent RSDs in the initial calibration for certain analytes, select data are considered estimated and usable for limited purposes.

L.2 Due to the low recovery of benzene in the continuing calibration standard on September 3, 1993 (file No. 039R0101.D), the PQL for this analyte in the associated samples and blanks is qualified "J" as estimated and are usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX:	Water and Soil
DATE:	May 17, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 13 soil samples and 1 water sample from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 472). Eight of the samples required analysis for the halogenated volatile organic compounds (HVOCs) and all of the samples required analysis for the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed on September 3 and September 4, 1993 for HVOCs by USEPA Method 8010, and BTEX compounds by USEPA Method 8020.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-S01	1478	Soil
WAI-SS04-S02	1480	Soil
WAI-SS04-S03	1482	Soil
WAI-SS04-S04	1484	Soil
WAI-SS04-S05	1486	Soil
WAI-SS04-S06	1488	Soil
WAI-SS09-SD01	1490	Soil
WAI-SS09-S01	1492	Soil
WAI-SS09-S02-2.5	1494	Soil
WAI-SS09-S03	1496	Soil
WAI-EB-02	1500	Water
WAI-SS09-S04	1502	Soil
WAI-SS09-S05	1504	Soil
WAI-SS09-S06	1506	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-SS04-S01 and WAI-SS04-S05 were designated as field replicates, and sample number WAI-EB-02 was designated as an equipment blank.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a five point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
benzene	28.3 %
o-xylene	26.5 %

Due to the large percent RSDs, the detected results for these compounds in all project samples analyzed on system 1-2 when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory analyzed a four point initial calibration on system 3-4 on August 29, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC

criteria of 20.0%.

Compound	% RSD
toluene	26 %
ethylbenzene	53 %
m & p-xylene	41 %
o-xylene	28 %

Due to the large percent RSDs, the detected results for these compounds in all project samples analyzed on system 3-4 when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The percent recovery for benzene (59%), toluene (54%), and ethylbenzene (67%) in the continuing calibration standard on September 4, 1993 (file No. 069F0101.D) exceeded the percent recovery QC criteria of 75%-125%. Therefore, the detected results and the practical quantitation limit (PQL) for these compounds in the associated blanks and samples are qualified "J" as estimated and are usable for limited purposes.

C.2 All other QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-02 was designated as an equipment blank.

F.2 No target analytes were detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS04-S01 and WAI-SS04-S05 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 Discrepancies exist between the surrogate recoveries reported by the

laboratory and the surrogate recoveries regenerated by the reviewer for sample numbers WAI-SS04-S01 and WAI-SS04-S05. Listed below are the surrogate recoveries reported by the laboratory and the surrogate recoveries calculated by the reviewer.

ICF Site No.	Laboratory % Recovery	Validation % Recovery
WAI-SS04-S01	83	158
WAI-SS04-S05	89	169

The high surrogate recoveries in these two samples are probably due to interference from gasoline in the samples. This is not expected to have an effect on the results for the project samples.

H.2 The surrogate recovery QC criteria were met for all other project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 Sample WAI-SS07-S01 was used as the QC sample for the matrix spike/matrix spike duplicate analyses. This sample was not submitted on chain of custody record No. 472.

I.2 Carbon tetrachloride exhibited a high recovery in the matrix spike analysis, and carbon tetrachloride, 1,1,1-trichloroethane, and tetrachloroethene exhibited high recoveries in the matrix spike duplicate analysis. The recoveries of these compounds are listed below.

Analyte	MS % Recovery	MSD % Recovery
carbon tetrachloride	230	280
1,1,1-trichloroethane		170
tetrachloroethene		140

The analytical results are not qualified solely on the results of the matrix spike analyses.

I.3 All other matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 The FID detector on system 3-4 was not operating during the analysis of the project soil samples. The PID detector was used to quantitate the BTEX analytes in these samples.

J.2 No other problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The FID detector on system 3-4 was not operating during the analysis of the project soil samples. The reported results for the BTEX compounds in these samples

were reported using the PID detector with no confirmation on the FID detector. Therefore, the PQLs for the BTEX compounds in these samples are qualified "J", and the detected results for the BTEX compounds in these samples are qualified "NJ" as estimated, and the PQLs and the detected results are usable for limited purposes. Compound identification was confirmed using a second column and an alternate detector for the rest of the samples.

K.2 A discrepancy exists between the detected result reported by the laboratory (12 ppm) and the result regenerated by the reviewer (17 ppm) for xylene in sample WAI-SS04-S01. The detected result has been changed by the reviewer on the data summary form.

The laboratory indicated that discrepancies are probably due to inconsistent quantitation procedures. The laboratory was unable to reproduce some of the reported detected results which indicates that inconsistent quantitation procedures may have been used.

K.3 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Due to problems with the FID detector on system 3-4, select data in the project soil samples are qualified "J" or "NJ" and are usable for limited purposes.

L.2 The PID detector was used to quantitate the BTEX compounds detected in the project samples, therefore, qualification of the detected results for the BTEX compounds due to large %RSDs on the FID detector in the initial calibrations is not necessary.

L.3 Due to the recoveries of benzene, toluene, and ethylbenzene in continuing calibration file 069F0101.D exceeding the QC criteria, the PQL and detected results for these compounds in the associated samples and blanks are qualified "J" as estimated and are usable for limited purposes.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Keith Strout
ANALYSIS: HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX: Water and Soil
DATE: May 9, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 4 soil and 7 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 471). Three of the samples required analysis for the halogenated volatile organic compounds (HVOCs) and all of the samples required analysis for the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed on September 3 and September 4, 1993 for HVOCs by USEPA Method 8010, and BTEX compounds by USEPA Method 8020.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-SW01	1408	Water
WAI-SS04-SW04	1418	Water
WAI-TB-02	1422	Water
WAI-AB-01	1424	Water
WAI-SS04-SW02	1428	Water
WAI-SS04-SW03	1432	Water
WAI-SS04-SD01	1440	Soil
WAI-SS04-SD02	1434	Soil
WAI-SS04-SD03	1436	Soil
WAI-SS04-SD04	1438	Soil
WAI-SS09-SW01	1446	Water

The following QC sample designations were included in project documentation: sample

numbers WAI-SS04-SW01 and WAI-SS04-SW04 were designated as field duplicates, sample number WAI-TB-02 was designated as a travel blank, and sample number WAI-AB-01 was designated as an ambient blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a five point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
benzene	28.3 %
o-xylene	26.5 %

Due to the large percent RSDs, the detected results for these compounds in all project samples analyzed on system 1-2 are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory analyzed a four point initial calibration on system 3-4 on August 29, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC

criteria of 20.0%.

Compound	% RSD
toluene	26 %
ethylbenzene	53 %
m & p-xylene	41 %
o-xylene	28 %

Due to the large percent RSDs, the detected results for these compounds are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-TB-02 was designated as a travel blank and sample number WAI-AB-01 was designated as an ambient blank.

F.2 No target analytes were detected in the travel blank at a concentration above the PQL and the results are considered acceptable.

F.3 No target analytes were detected in the ambient blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analysis:

G.1 A QC limit for precision of $\leq$ 20%, as measured by Relative Percent Difference (RPD) between water sample values, was specified for field duplicate comparability.

G.2 Samples WAI-SS04-SW01 and WAI-SS04-SW04 were utilized for field duplicate analysis. The results of the field duplicate analyses, as reported by the laboratory, met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All of the surrogate QC recovery criteria were met and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 Sample number BRW-SS02-S02 was used for the soil matrix spike/matrix spike duplicate analyses. There were no matrix spike/matrix spike duplicate analyses submitted for the water matrix. Sample number BRW-SS02-S02 was from the Point

Barrow site, not from the Wainwright site. It is the opinion of the reviewer that since the similarity of the soil type from each site is not described, it is not known what affect, if any, this will have on the quality of the data.

I.2 All matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. <u>System Performance:</u>

J.1 The FID detector was not operating during the analysis of samples WAI-SS04-SD02, WAI-SS04-SD03, WAI-SS04-SD01, and WAI-SS04-SD04.

J.2 No other problems with system performance were observed for the project samples.

K. <u>Quantitation and Identification:</u>

K.1 The FID detector was not operating during the analysis of samples WAI-SS04-SD02, WAI-SS04-SD03, WAI-SS04-SD01, and WAI-SS04-SD04. The reported results for the BTEX compounds in these samples were reported using the PID detector with no confirmation on the FID detector. Therefore, the PQLs for the BTEX compounds in these samples are qualified "J" as estimated and are usable for limited purposes. Compound identification was confirmed using a second column and an alternate detector for the rest of the samples.

K.2 The laboratory did not submit the raw data for sample WAI-SS04-SW04. The laboratory has not responded to requests by the reviewer to resubmit raw data which is missing. Therefore, since the reported results for this sample cannot be verified by the reviewer, the PQLs for the HVOCs and the BTEX compounds in this sample are qualified "R" as rejected and unusable.

K.3 The laboratory did not report results for the HVOC analysis for sample number WAI-SS09-SW01. However, the laboratory did analyze this sample for the HVOC compounds, and the reviewer has determined that the HVOC compounds are not present in sample number WAI-SS09-SW01 at a concentration above the PQLs.

K.4 No other problems were observed with compound quantitation and identification.

L. <u>Conclusion:</u>

L.1 There were no HVOC or BTEX compounds detected in any of the project samples at concentrations above the PQLs.

L.2 Due to missing data, the PQLs for the HVOC and BTEX compounds are qualified "R" as rejected and are unusable.

L.3 Due to problems with the FID detector, select data in some samples are qualified "J" and are usable for limited purposes.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Keith Strout
ANALYSIS: HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX: Water and Soil
DATE: May 11, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 7 soil and 3 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 468). Seven of the samples required analysis for the halogenated volatile organic compounds (HVOCs) and all of the samples required analysis for the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed on September 3 and September 4, 1993 for HVOCs by USEPA Method 8010, and BTEX compounds by USEPA Method 8020.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-SD01	1452	Soil
WAI-SS07-SD02	1454	Soil
WAI-SS07-SD03	1456	Soil
WAI-SS07-SD04	1450	Soil
WAI-SS07-S01	1458	Soil
WAI-SS07-S02	1460	Soil
WAI-SS07-S03	1462	Soil
WAI-SS07-SW01	1466	Water
WAI-SS07-SW02	1470	Water
WAI-SS07-SW03	1474	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS07-S01 and WAI-SS07-S03 were designated as field replicates.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a five point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
benzene	28.3 %
o-xylene	26.5 %

Due to the large percent RSDs, the detected results for these compounds in all project samples analyzed on system 1-2 when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory analyzed a four point initial calibration on system 3-4 on August 29, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
toluene	26 %
ethylbenzene	53 %
m & p-xylene	41 %
o-xylene	28 %

Due to the large percent RSDs, the detected results for these compounds in all project samples analyzed on system 3-4 when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted with this project sample set.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS07-S01 and WAI-SS07-S03 were utilized for field replicate analysis. The RPDs for the detected results for ethylbenzene and xylene in both samples exceed the QC criteria. It is the opinion of the reviewer that the large RPDs may be due to interference from gasoline in the samples. It is not known what affect this will have on the data.

H. Surrogate Recoveries:

H.1 The surrogate recovery in sample number WAI-SS07-SD01 (45%) exceeded the surrogate recovery QC criteria. Therefore, the PQLs for the target analytes in this sample are qualified "J" as estimated and are usable for limited purposes.

H.2 The laboratory did not spike the surrogate into sample number WAI-SS07-SD02. Therefore, the PQLs for the target analytes in this sample are qualified "J" as estimated and are usable for limited purposes.

H.3 The surrogate recovery QC criteria were met for all other project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 Sample number WAI-SS07-SD01 was used for the soil matrix spike/matrix spike duplicate analyses. There were no matrix spike/matrix spike duplicate analyses submitted for the water matrix.

I.2 All matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 The FID detector was not operating during the analysis of samples WAI-SS07-SD01, WAI-SS07-SD02, WAI-SS07-SD03, WAI-SS07-SD04, WAI-SS07-S01, WAI-SS07-S02, and WAI-SS07-S03.

J.2 No other problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The FID detector was not operating during the analysis of sample numbers WAI-SS07-SD01, WAI-SS07-SD02, WAI-SS07-SD03, WAI-SS07-SD04, WAI-SS07-S01, WAI-SS07-S02, and WAI-SS07-S03. The reported results for the BTEX compounds in these samples were reported using the PID detector with no confirmation on the FID detector. Therefore, the PQLs for the BTEX compounds in these samples are qualified "J", and the detected results for the BTEX compounds in these samples are qualified "NJ" as estimated, and the PQLs and the detected results are usable for limited purposes. Compound identification was confirmed using a second column and an alternate detector for the rest of the samples.

K.2 The laboratory did not report a detected result for xylene in sample number WAI-SS07-S02, or for ethylbenzene and xylene in sample number WAI-SS07-S03. Although the FID detector was not functioning at the time these two sample were analyzed, there is evidence from the PID detector that these analytes are present in the samples at concentration above the PQLs. In addition, these samples contained gasoline which further indicates that some of the BTEX compounds may be present in the samples. The calculated amounts of these two analytes in sample numbers WAI-SS07-S02 and WAI-SS07-S03 have been entered on the data summary forms and are qualified "NJ" as estimated and are usable for limited purposes.

K.3 Discrepancies exist between the detected results reported by the laboratory and the results regenerated by the reviewer for sample WAI-SS07-S01. Listed below are the target analyte results where discrepancies exist. Results are reported in parts per million (ppm).

Target Analyte	Laboratory Result	Validation Result
tetrachloroethylene	7	10
ethylbenzene	3	4
total xylene	11	15

The laboratory indicated that the discrepancies are probably due to inconsistent

quantitation procedures. The laboratory was unable to reproduce some of the reported detected results which indicates that inconsistent quantitation procedures may have been used.

K.4 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Due to problems with the FID detector on system 3-4, select data in some samples are qualified "J" or "NJ" and are usable for limited purposes.

L.2 The PID detector was used to quantitate the BTEX compounds detected in the project samples, therefore, qualification of the detected results for the BTEX compounds due to large %RSDs on the FID detector in the initial calibrations is not necessary.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX:	Water and Soil
DATE:	May 12, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 7 soil and 3 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 462). Five of the samples required analysis for the halogenated volatile organic compounds (HVOCs) and all of the samples required analysis for the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed on September 2 and September 3, 1993 for HVOCs by USEPA Method 8010, and the BTEX compounds by USEPA Method 8020.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-S01	1236	Soil
WAI-BKGD-SD01	1238	Soil
WAI-SS08-SD01	1240	Soil
WAI-SS08-SD02	1242	Soil
WAI-SS08-SD03	1244	Soil
WAI-SS08-SD04	1246	Soil
WAI-SS08-SD05	1248	Soil
WAI-LF05-SW02	1252	Water
WAI-LF05-SW01	1258	Water
WAI-TB-01	1260	Water

The following QC sample designations were included in project documentation: sample

numbers WAI-SS08-SW03 and WAI-SS08-SW04 were designated as field duplicates, and sample number WAI-EB-01 was designated as an equipment blank.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 3-4 on August 29, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
toluene	26 %
ethylbenzene	53 %
m & p-xylene	41 %
o-xylene	28 %

Due to the large percent RSDs, the detected results for these compounds when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the PQLs and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQLs and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-TB-01 was designated as a travel blank.

F.2 No target compounds were detected in the travel blank at a concentration above the PQLs and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS08-SD04 and WAI-SS08-SD05 were utilized for field replicate analysis. The laboratory did not report results for the analysis of sample number WAI-SS08-SD05. During the analysis of the sample, all three detectors exhibited a saturated response. The laboratory did not dilute and reanalyze the sample. However, since there was nothing detected in sample number WAI-SS08-SD04, it appears that these two samples are not identical.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 There were no matrix spike/matrix spike duplicate analyses submitted with this project sample set.

J. System Performance:

J.1 The FID detector failed during the analysis of sample number WAI-SS08-SD03. The PID detector was used to determine the presence of the BTEX compounds in this sample.

J.2 No other problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory did not report results for the analysis of sample number WAI-SS08-SD05. During the analysis of the sample, all three detectors exhibited a saturated response. The laboratory did not dilute and reanalyze the sample in an attempt to identify the cause of the saturated response. It is possible that the material is of biogenic origin, however, the ECD detector also exhibited a saturated response

which suggests that halogenated compounds are present in the sample.

K.2 A discrepancy exists between the detected amount reported by the laboratory (0.08 ppm) and the amount calculated by the reviewer (0.5 ppm) for toluene in sample number WAI-SS08-SD04. It is the opinion of the reviewer that the laboratory made an incorrect adjustment for the moisture content in the sample.

K.3 Compound identification was confirmed using a second column and an alternate detector.

L. Conclusion:

L.1 Due to a saturated response on the three detectors during the analysis of sample number WAI-SS08-SD05, the laboratory did not report any analytical results for this sample. The reviewer was unable to determine if any target compounds were present in this sample.

L.2 Due to an incorrect adjustment for the moisture content in sample number WAI-SS08-SD04, the detected amount of toluene in this sample has been changed on the data summary form from 0.08 ppm to 0.5 ppm by the reviewer.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX:	Water
DATE:	May 10, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 6 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 466). Two of the samples required analysis for the halogenated volatile organic compounds (HVOCs) and all of the samples required analysis for the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed on September 2 and September 3, 1993 for HVOCs by USEPA Method 8010, and the BTEX compounds by USEPA Method 8020.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS08-SW02	1264	Water
WAI-SS08-SW01	1268	Water
WAI-SS08-SW03	1272	Water
WAI-SS08-SW04	1276	Water
WAI-EB-01	1282	Water
WAI-BKGD-SW01	1286	Water

The following QC sample designations were included in project documentation: sample numbers WAI-SS08-SW03 and WAI-SS08-SW04 were designated as field duplicates, and sample number WAI-EB-01 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets

submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 3-4 on August 29, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
toluene	26 %
ethylbenzene	53 %
m & p-xylene	41 %
o-xylene	28 %

Due to the large percent RSDs, the detected results for these compounds when quantitated using the FID detector are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the PQLs and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQLs and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-01 was designated as an equipment blank.

F.2 No target compounds were detected in the equipment blank at a concentration above the PQLs and the results are considered acceptable.

G. Field Duplicate Analysis:

G.1 A QC limit for precision of ≤ 20%, as measured by Relative Percent Difference (RPD) between water sample values, was specified for field duplicate comparability.

G.2 Samples WAI-SS08-SW03 and WAI-SS08-SW04 were utilized for field duplicate analysis. The results of the field duplicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 There were no water matrix spike/matrix spike duplicate analyses submitted with this project sample set.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 No problems were observed with compound quantitation and identification.

K.2 Compound identification was confirmed using a second column and an alternate detector.

L. Conclusion:

L.1 There were no target analytes detected in any of the project samples at concentrations above the PQLs.

L.2 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX:	Water and Soil
DATE:	April 29, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 8, 1993 (referenced chain of custody record No. 454). One of the water samples and three of the soil samples required analysis for the halogenated volatile organic compounds (HVOCs) and the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The laboratory analyzed the samples for HVOCs by USEPA Method 8010 and the BTEX compounds by USEPA Method 8020 on September 9 and September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-EB-03	1896	Water
WAI-SS09-2S07	1898	Soil
WAI-STKP-S01	1900	Soil
WAI-STKP-S02	1902	Soil

The following QC sample designation was included in project documentation: sample number WAI-EB-03 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020,

and the Project Sampling and Analysis Plan.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a five point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
benzene	28.3 %
o-xylene	26.5 %

Due to the large percent RSDs, the detected results for these compounds in all project samples are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory was unable to demonstrate linearity throughout the quantitation range using the ECD detector because the detector was saturated at low concentrations. It is the opinion of the reviewer that the ECD detector can be used only to confirm the presence of the halogenated compounds. Quantitation of the halogenated compounds should have been done on the PID or FID detector when possible, and only if compound detection was confirmed on the ECD.

C. Continuing Calibrations:

C.1 The continuing calibrations were performed at a concentration of 500 ppb. At this concentration, the ECD response for all of the halogenated compounds is saturated. Therefore, the ECD detector should only be used to confirm the presence of the halogenated compounds.

C.2 The percent recovery for 1,1,1-trichloroethane (66%) and carbon

tetrachloride (62%) in the continuing calibration standard on September 10, 1993 (file No. 001R0101.D) exceeded the percent recovery QC criteria of 75%-125%. Therefore, the detected results and the PQLs for these compounds in the associated blanks and samples are qualified "J" as estimated and are usable for limited purposes.

C.3 All other QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-03 was designated as an equipment blank.

F.2 No target analytes were detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 There were no field replicate samples associated with this project sample set.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recovery reported by the laboratory (76%) and the surrogate recovery calculated by the reviewer (86%) for sample number WAI-SS09-2S07. It appears that the surrogate recovery calculated by the laboratory was transcribed incorrectly from the recovery worksheet to the data summary form. This is not expected to have an affect on the quality of the data because the surrogate recovery QC criteria was met.

H.2 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 Sample number WAI-SS04-2S07 was used for the matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 It is the opinion of the reviewer that the ECD detector cannot be used for the quantitation of the halogenated compounds because the detector displayed saturation

at low concentrations. The ECD detector can be used for halogenated compound identification confirmation.

J.2 No other problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 Compound identification was confirmed using a second column and an alternate detector.

K.2 No other problems were observed for compound quantitation and identification.

L. Conclusion:

L.1 Due to the low recovery of 1,1,1-trichloroethane and carbon tetrachloride in the continuing calibration standard on September 10, 1993 (file No. 001R0101.D), the PQLs for these two analytes in the associated samples and blanks are qualified "J" as estimated and are usable for limited purposes.

L.2 There were no target analytes detected at a concentration above the PQLs in any of the project samples.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Keith Strout
ANALYSIS:	HVOCs by USEPA Method 8010 and BTEX compounds by USEPA Method 8020
MATRIX:	Water and Soil
DATE:	April 28, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 7, 1993 (referenced chain of custody record No. 447). Seven of the samples required analysis for the halogenated volatile organic compounds (HVOCs) and the BTEX compounds by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The laboratory analyzed the samples for HVOCs by USEPA Method 8010 and the BTEX compounds by USEPA Method 8020 on September 9 and September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-2SW02	1870	Water
WAI-BKGD-2SD02	1874	Soil
WAI-BKGD-2S02	1876	Soil
WAI-SS04-2S07	1877	Soil
WAI-SS09-2SW02	1882	Water
WAI-SS09-2SD02	1884	Soil
WAI-TB-03	1886	Water

The following QC sample designation was included in project documentation: sample number WAI-TB-03 was designated as a travel blank.

The analytical results with qualifications are presented on modified sample data sheets

submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Methods 8010 and 8020, and the Project Sampling and Analysis Plan.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for HVOCs for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a five point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 1 ppb to 1000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. Percent relative standard deviations (%RSDs) were calculated for all compounds using the calibration factors from the initial calibration using the FID detector. The % RSDs for the following compounds exceeded the recommended QC criteria of 20.0%.

Compound	% RSD
benzene	28.3 %
o-xylene	26.5 %

Due to the large percent RSDs, the detected results for these compounds in all project samples are qualified "J" as estimated and are usable for limited purposes.

B.2 The laboratory was unable to demonstrate linearity throughout the quantitation range using the ECD detector because the detector was saturated at low concentrations. It is the opinion of the reviewer that the ECD detector can be used only to confirm the presence of the halogenated compounds. Quantitation of the halogenated compounds should have been done on the PID or FID detector when possible, and only if compound detection was confirmed on the ECD.

C. Continuing Calibrations:

C.1 The continuing calibrations were performed at a concentration of 500 ppb. At this concentration, the ECD response for all of the halogenated compounds is saturated. Therefore, the ECD detector should only be used to confirm the presence

of the halogenated compounds.

C.2 The percent recovery for 1,1,1-trichloroethane (66%) and carbon tetrachloride (62%) in the continuing calibration standard on September 10, 1993 (file No. 001R0101.D) exceeded the percent recovery QC criteria of 75%-125%. Therefore, the detected results and the PQLs for these compounds in the associated blanks and samples are qualified "J" as estimated and are usable for limited purposes.

C.3 All other QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blanks at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

E. Instrument Blanks:

E.1 No target analytes were detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-TB-03 was designated as a travel blank.

F.2 No target analytes were detected in the travel blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 There were no field replicate samples associated with this project sample set.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 Sample number WAI-SS04-2S07 was used for the matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 It is the opinion of the reviewer that the ECD detector cannot be used for the quantitation of the halogenated compounds because the detector displayed saturation at low concentrations. The ECD detector can be used for halogenated compound identification confirmation.

J.2 No other problems with system performance were observed for the project

samples.

K. Quantitation and Identification:

K.1 Compound identification was confirmed using a second column and an alternate detector.

K.2 No other problems were observed for compound quantitation and identification.

L. Conclusion:

L.1 Due to the low recovery of 1,1,1-trichloroethane and carbon tetrachloride in the continuing calibration standard on September 10, 1993 (file No. 001R0101.D), the PQLs for these two analytes in the associated samples and blanks are qualified "J" as estimated and are usable for limited purposes.

L.2 There were no target analytes detected at a concentration above the PQLs in any of the project samples.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-D512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX:	Water
DATE:	May 10, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 4 soil and 7 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 471). One water sample was requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The sample was analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 3, 1993.

The ICF site identification number and corresponding FBI laboratory sample identification number is listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS09-SW01	1444	Water

It should be noted that all quantitation limits reported by the laboratory for PCBs (2 ppb) in the water project sample were lower than those specified in the Project Sampling and Analysis Plan (5 ppb). It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF5 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 37.2% was calculated using calibration factors determined from the initial calibration. The %RSD of 37.2 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 Continuing calibration standard (File 098R2101) displayed a percent recovery of 136% for Aroclor 1254, exceeding the QC criteria of 75-125%. Therefore the PQLs for sample WAI-SS09-SW01 are qualified "J" as estimated and usable for limited purposes.

C.2 All other QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analysis with this project sample set.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike/matrix spike duplicate samples were submitted with the PCB fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project sample

analyses.

K. Quantitation and Identification:

K.1 The laboratory reported incorrect PQLs for sample WAI-SS09-SW01. They have been corrected on the data summary forms by the reviewer.

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K.2 Continuing calibration standard (File 098R2101) displayed a percent recovery of 136% for Aroclor 1254, exceeding the QC criteria of 75-125%. Therefore the PQLs for sample WAI-SS09-SW01 are qualified "J" as estimated and usable for limited purposes.

K.3 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blank and the sample.

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L.2 The PQLs have been raised for sample WAI-SS09-SW01 on the data summary forms by the reviewer.

L.3 Due to continuing calibration problems the PQLs for sample WAI-SS09-SW01 were qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX: Water and Soil
DATE: May 2, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 7, 1993 (referenced chain of custody record No. 447). Five of the samples were requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-2SW02	1869	Water
WAI-BKGD-2SD02	1874	Soil
WAI-BKGD-2S02	1876	Soil
WAI-SS09-2SW02	1880	Water
WAI-BKGD-SW02	1904	Water

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for diesel water samples were reported with the same PQLs as for the soil samples, the PQLs have been corrected on the summary results page by the reviewer.

Soil project samples were higher than those specified in the Project Sampling and Analysis Plan. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on August 21, 1994. The range of the initial calibration was from 0.1 ppm to 10 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 30.3% was calculated using calibration factors determined from the initial calibration. The %RSD of 30.3 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All three continuing calibration standards (128-143%) exceeded the percent recovery QC criteria of 75-125%. Therefore, the practical quantitation limit (PQL) for the method blanks and samples is qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicate samples submitted for analysis with this project sample set.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recoveries reported by the laboratory and the surrogate recoveries calculated by the reviewer, for two of the project samples as listed below. The reviewer calculated the recoveries of the two samples using the surrogate area from the continuing calibration standard.

ICF Site No.	Laboratory Results	Validator Results
WAI-BKGD-2SW02	155%	98%
WAI-BKGD-SW02	165%	105%

The discrepancy is probably due to inconsistent quantitation procedures performed by the laboratory.

H.2 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 The laboratory did not perform any matrix spike and matrix spike duplicate analyses for the PCB fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory reported soil PQLs for the water sample PQLs. They have been corrected on the data summary forms by the reviewer.

K.2 The laboratory did not adjust the PQL for moisture content for samples WAI-BKGD-2SD02 and WAI-BKGD-2S02. They have been adjusted on the summary results page by the reviewer.

K.3 Biogenic interference was present in all of the samples. It is the opinion of the reviewer that this will not affect the quality of the data.

K.4 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blank and the samples.

L.2 Due to previously mentioned problems with the continuing calibration standards, the PQL for the method blank and samples is qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Clyde Hedin
ANALYSIS:	Pesticides by USEPA Method 8080
MATRIX:	Soil
DATE:	May 27, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 7 soil and 2 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 462). Two soil samples were requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for pesticides by USEPA Method 8080 on August 31 and on September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-S01	1236	Soil
WAI-BKGD-SD01	1238	Soil

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on August 21, 1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the EC detector. The %RSDs for the following target analytes exceeded the recommended QC criteria of 20.0%.

Compound	%RSD
Endosulfan II	37.9
Endrin aldehyde	30.6
DDT and Endosulfan sulfate	32.1
Endrin ketone	32.6

All detected results for these analytes in the samples are qualified "J" as estimated and usable for limited purposes.

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 The continuing calibration and column degradation standards analyzed on 8/31/93, two hours prior to the samples, appeared to be bad injections. The previous continuing calibration standard, analyzed 20 hours prior to the samples on 8/30/93, was therefore used to monitor system performance. The calibration factor percent deviations (%Ds) for the following target analytes exceeded the recommended QC criteria of ± 25.0%.

Compound	%RSD
Endrin aldehyde	-39.8
DDT and Endosulfan sulfate	-28.3
Endrin ketone	-33.6

C.2 Because the continuing calibration %Ds were exceeded for endrin aldehyde, DDT, endosulfan sulfate, and endrin ketone, the PQLs of these analytes in all method blanks and project samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 The laboratory did not report the pesticide results for the method blank associated with this sample set. The reviewer modified the sample report summary form to included the pesticide results for the soil method blank. Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analyses with the pesticide fraction.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analyses with the pesticide fraction.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for the pesticide fraction.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown standard data associated with the project sample set could not be located or were possibly mislabeled, as described in section C.1. Endrin and 4,4'-DDT breakdown performance could therefore not be established with this project sample set.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 Because the continuing calibration factor %Ds for endrin aldehyde, DDT, endosulfan sulfate, and endrin ketone, the PQLs of these analytes in the project method blank and samples are qualified "J" as estimated and usable for limited purposes.

K.2 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 0.5 ppb for the soil samples.

K.3 The soil sample results were confirmed on GC instrument ICF6 using a different GC column and a different temperature program. No target analytes were detected in the two samples.

K.4 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 The continuing calibration and column degradation standards analyzed prior to the project samples were unusable. The continuing calibration standard analyzed 20 hours prior to the samples was therefore used to monitor calibration performance.

L.2 Because the continuing calibration %Ds were exceeded for endrin aldehyde, DDT, endosulfan sulfate, and endrin ketone, the PQLs of these analytes in the method blanks and project samples are qualified "J" as estimated and usable for limited purposes.

L.3 Confirmatory analysis was performed on the two project samples using an alternate GC temperature program. No pesticide target analytes were detected in the samples using either procedure.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Pesticides by USEPA Method 8080
MATRIX:	Water and Soil
DATE:	May 23, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil samples and 1 water sample from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 472). Two soil samples and one water sample were requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for pesticides by USEPA Method 8080 on September 2 through September 4, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-S02	1480	Soil
WAI-SS04-S04	1484	Soil
WAI-EB-02	1498	Water

The laboratory reported soil practical quantitation limits (PQLs) for the water sample listed above. The PQLs have been corrected on the data summary forms by the reviewer.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional

Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF5 on August 21, 1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the EC detector. The %RSD for the following target analyte exceeded the recommended QC criteria of 20.0%

Compound	%RSD
beta-BHC	22%

All detected results for beta-BHC in the samples are qualified "J" as estimated and usable for limited purposes.

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 No continuing calibrations were analyzed during the sequence with the exception of the column degradation solution containing Endrin and DDT. The stability of the instrument, GC column, and detector were monitored using the Endrin and DDT column degradation solution and the Aroclor 1254 continuing calibration solution. These two solutions were used to check area consistency and surrogate area stability. It is the opinion of the reviewer, that since no pesticide continuing calibration solutions were analyzed, this is the only criteria that can be used to monitor system performance.

C.2 Due to the absence of pesticide continuing calibrations, the PQLs for all method blanks and samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-02 was designated as an equipment blank.

F.2 Pesticide target analytes were not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analyses with the pesticide fraction.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for the pesticide fraction.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory reported incorrect PQLs for the water sample. They have been corrected on the data summary form by the reviewer.

K.2 Due to the absence of pesticide continuing calibrations, all PQLs for the project method blank and samples are qualified "J" as estimated and usable for limited purposes.

K.3 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 0.5 ppb for the soil samples and 10 ppb for the water sample.

K.4 The soil sample results were confirmed on GC instrument ICF6 using a different GC column and the water sample results were confirmed on GC instrument ICF5 using the same GC column but a different temperature program. No target analytes were detected in the three samples.

K.5 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 The PQLs for the water sample have been adjusted on the data summary forms by the reviewer.

L.3 Due to the absence of pesticide continuing calibrations, all PQLs for the project method blank and samples are qualified "J" as estimated and usable for limited purposes.

L.3 All three samples were reanalyzed either on a different GC column or as in the case of the water sample, the same GC column but employing a different GC temperature program to produce different target analyte retention times. No target analytes were detected in the samples using either procedure.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Pesticides by USEPA Method D8080
MATRIX:	Soil
DATE:	May 9, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 463). One soil sample was requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The sample was analyzed for pesticides by USEPA Method 8080 on August 31, 1993.

The ICF site identification number and corresponding FBI laboratory sample identification number is listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-LF05-S04-1.5	1228	Soil

The quantitation limits reported by the laboratory for the soil sample (0.01 ppm) were lower than those specified in the Project Sampling and Analysis Plan (0.05 ppm). It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF6 on August 21, 1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. Percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the EC detector. The %RSDs for the following target analytes exceeded the recommended QC criteria of 20.0%

Compound	%RSD
Endosulfan II	38%
Endrin Aldehyde	31%
DDT/Endosulfan Sulfate	32%
Endrin Ketone	33%

B.2 Due to the large percent RSDs, the detected results for these compounds are qualified "J" as estimated and are usable for limited purposes.

B.3 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 The continuing calibration standard (File 097R0101) percent recovery for DDT/Endosulfan Sulfate (134%) exceeded the QC criteria of 75-125%. The standard was also analyzed more than 12 hours prior to the associated blank and sample. Therefore, the PQL for all target analytes in the method blank and sample are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analyses with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analyses with this project sample set.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for the pesticide fraction.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 The continuing calibration standard was analyzed more than 12 hours prior to the associated method blank and samples. Therefore, the PQL for the method blank and the sample is qualified "J" as estimated and usable for limited purposes.

K.2 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 0.5 ppm for the soil sample.

K.3 The sample was analyzed on the GC confirmation column to verfiy that no target analytes were present in the sample at a concentration above the PQLs.

K.4 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 No target analytes were detected in the method blank or the sample at a concentration above the PQLs.

L.2 Due to the continuing calibration standard exceeding the 12 hour QC criteria, the PQL for all target analytes in the method blank and the sample are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Pesticides by USEPA Method 8080
MATRIX: Water
DATE: May 11, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 6 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 466) Three samples were requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for pesticides by USEPA Method 8080 on September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS08-SW02	1262	Water
WAI-EB-01	1280	Water
WAI-BKGD-SW01	1284	Water

The quantitation limits reported by the laboratory for the water samples (0.2 ppb) were lower than those specified in the Project Sampling and Analysis Plan (2.5 ppb). It is the opinion of the reviewer that the quality of the data is not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF5 on August 21, 1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the EC detector. The %RSD for the following target analyte exceeded the recommended QC criteria of 20.0%

Compound	%RSD
beta-BHC	22%

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 No continuing calibrations were analyzed during the sequence with the exception of the column degradation solution containing Endrin and DDT. The stability of the instrument, GC column, and detector were monitored using the Endrin and DDT column degradation solution and the Aroclor 1254 continuing calibration solution. These two solutions were used to check area consistency and surrogate area stability. It is the opinion of the reviewer, that since no pesticide continuing calibration solutions were analyzed, this is the only criteria that can be used to monitor system performance.

C.2 Due to the absence of pesticide continuing calibrations, the PQLs for all blanks and samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-01 was designated as an equipment blank.

F.2 Target analytes were not detected in the equipment blank at a concentration above the PQLs and the results are considered acceptable.

G. Field Duplicate Analyses:

G.1 There were no field duplicates submitted for analyses for the pesticide fraction.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for the pesticide fraction.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 Due to the absence of pesticide continuing calibrations, all PQLs for all project method blanks and samples are qualified "J" as estimated and usable for limited purposes.

K.2 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 25 ppm for the water samples.

K.3 The samples were analyzed on the GC confirmation column to verify that no target analytes were present in the sample at a concentration above the PQLs.

K.4 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 No target analytes were detected in the method blank or the samples at a concentration above the PQLs.

L.2 Due to the absence of pesticide continuing calibrations, all PQLs for the project method blank and samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Pesticides by USEPA Method 8080
MATRIX: Water and Soil
DATE: May 18, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 7 soil and 3 water samples from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 468). Three soil samples and two water samples were requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for pesticides by USEPA Method 8080 on September 2 through September 4, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-SD01	1452	Soil
WAI-SS07-SD02	1454	Soil
WAI-SS07-S01	1458	Soil
WAI-SS07-SW01	1464	Water
WAI-SS07-SW02	1468	Water

The laboratory reported soil practical quantitation limits (PQLs) for the two water samples listed above. The PQLs have been corrected on the data summary forms by the reviewer.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This

report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF5 on August 21, 1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the EC detector. The %RSD for the following target analyte exceeded the recommended QC criteria of 20.0%

Compound	%RSD
beta-BHC	22%

All detected results for beta-BHC in the samples are qualified "J" as estimated and usable for limited purposes.

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 No continuing calibrations were analyzed during the sequence with the exception of the column degradation solution containing Endrin and DDT. The stability of the instrument, GC column, and detector were monitored using the Endrin and DDT column degradation solution and the Aroclor 1254 continuing calibration solution. These two solutions were used to check area consistency and surrogate area stability. It is the opinion of the reviewer, that since no pesticide continuing calibration solutions were analyzed, this is the only criteria that can be used to monitor system performance.

C.2 Due to the absence of pesticide continuing calibrations, the PQLs for all method blanks and samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration

above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analyses with the pesticide fraction.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for the pesticide fraction.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 Due to sample contamination and possible target analyte identification, the three soil samples were reanalyzed on the GC confirmation column.

J.4 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory reported detected results for Endrin Aldehyde (0.03 ppm) and 4,4'-DDT (0.16 ppm) in sample WAI-SS07-S01. It is the opinion of the reviewer that due to the presence of biogenic material in the sample, and the lack of reproducible retention times associated with the standards and samples on both the primary and secondary GC columns, the data does not support detected results for Endrin Aldehyde and 4,4'-DDT in the sample. The results have been changed on the data summary form by the reviewer to reflect that these two target analytes were not detected at a concentration above the PQL. It is possible that pesticides may be present in the sample, but due to interference present in the sample causing retention time shifts, identification is not possible.

K.2 The laboratory reported incorrect PQLs for the two water samples. They have been corrected on the data summary forms by the reviewer.

K.3 Due to the absence of pesticide continuing calibrations, all PQLs for the

project method blank and samples are qualified "J" as estimated and usable for limited purposes.

K.4 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 0.5 ppm for the soil samples and 10 ppm for the water samples.

K.5 The soil samples were analyzed on the GC confirmation column due to possible detected target analytes and interference present on the primary GC column.

K.6 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 The laboratory reported detected results for Endrin Aldehyde (0.03 ppm) and 4,4'-DDT (0.16 ppm) in sample WAI-SS07-S01. It is the opinion of the reviewer that due to contamination from possible biogenic material, the detected results of these two target analytes can not be determined from the information obtained on the primary and secondary GC columns. Therefore the detected results for Endrin Aldehyde and 4,4'-DDT in the samples have been changed on the data summary form by the reviewer to reflect that these two target analytes were not detected at a concentration above the PQL.

L.2 The PQLs for the two water samples have been adjusted on the data summary forms by the reviewer.

L.3 Due to the absence of pesticide continuing calibrations, all PQLs for the project method blank and samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Pesticides by USEPA Method 8080
MATRIX: Water and Soil
DATE: May 2, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 7, 1993 (referenced chain of custody record No. 447). Five samples were requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for pesticides by USEPA Method 8080 on September 10, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-2SW02	1869	Water
WAI-BKGD-2SD02	1874	Soil
WAI-BKGD-2S02	1876	Soil
WAI-SS09-2SW02	1880	Water
WAI-BKGD-SW02	1904	Water

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Tech nicalHolding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on September 1, 1 993.The range of the initial calibration was from 0.01 ppm to 1.0 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the ECD detector. The %RSD for the following target analytes exceeded the recommended QC criteria of 20.0%

Compound	%RSD
Endrin/DDD	22.2%

Due to the large percent RSD, the detected result for Endrin and DDD are qualified "J" as estimated and is usable for limited purposes.

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 The continuing calibration standard (File 049R0801) percent recoveries exceeded the QC criteria of 75-125%. Therefore, the PQL for all target analytes in the method blanks and samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analyses with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analyses with this project sample set.

H. Surrogate Recoveries:

H.1 The laboratory reported a surrogate recovery of 160% for sample WAI-BKGD-SW02, exceeding the QC criteria, whereas a surrogate recovery of 105% was calculated by the reviewer referencing the closest continuing calibration standard. The adjusted recovery has been corrected on the summary results page by the reviewer.

H.2 All other surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for this project sample set.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 0.5 ppm for this analyte in the soil samples and 25 ppb for the water sample.

K.2 Biogenic interference was present in all of the samples. It is the opinion of the reviewer that this will not affect the quality of the data.

K.3 The laboratory did not adjust the PQL for moisture content for samples WAI-BKGD-2SD02 and WAI-BKGD-2S02. They have been adjusted on the data summary forms by the reviewer.

K.4 All PQL for the water samples have been raised to <0.5 ppb by the reviewer on the data summary forms because the low point of the initial calibration was 0.01 ppm.

K.4 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 No target analytes were detected in the method blanks or the samples at a concentration above the PQL.

L.2 Due to the percent recoveries of the target analytes in the continuing calibration exceeding the QC criteria, the PQL for all target analytes in the method blank and samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Pesticides by USEPA Method 8080
MATRIX:	Water and Soil
DATE:	May 2, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 8, 1993 (referenced chain of custody record No. 454). One water sample was requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The sample was analyzed for pesticides by USEPA Method 8080 on September 10, 1993.

The ICF site identification number and corresponding FBI laboratory sample identification number is listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-EB-03	1894	Water

The quantitation limits reported by the laboratory for the water sample (0.1 ppb) was lower than those specified in the Project Sampling and Analysis Plan (2.5 ppb). Since the low point of the initial calibration is 0.01 ppm, the PQL should be 0.5 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The following QC sample designation was included in project documentation: sample number WAI-EB-03 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on September 1, 1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the ECD detector. The %RSD for the following target analytes exceeded the recommended QC criteria of 20.0%

Compound	%RSD
Endrin/DDD	22.2%
DDT/Endosulfan sulfate	29.1%

Due to the large percent RSDs, the detected results for the analytes listed above are qualified "J" as estimated and are usable for limited purposes.

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte are qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 The continuing calibration standard (File 049R0801) percent recoveries exceeded the QC criteria of 75-125%. Therefore, the PQL for all target analytes in the method blank and sample are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-03 was designated as an equipment blank.

F.2 Target analytes were not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analyses:

G.1 There were no field replicates submitted for analyses with this project sample set.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike and matrix spike duplicate analyses were performed for this project sample set.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 Due to sensitivity problems with methoxychlor in the initial calibration, the PQL was raised by the reviewer to 25 ppb for the water sample.

K.2 The PQLs for the water sample have been raised to <0.5 ppb by the reviewer on the data summary forms because the low point of the initial calibration was 0.01 ppm.

K.3 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 No target analytes were detected in the method blank or the sample at a concentration above the PQL.

L.2 Due to the percent recoveries of the target analytes in the continuing calibration exceeding the QC criteria, the PQL for all target analytes in the method blank and the sample are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX: Water
DATE: May 3, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil and 4 water samples from the Wainwright site on September 8, 1993 (referenced chain of custody record No. 454). One water sample was requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The sample was analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 10, 1993.

The ICF site identification number and corresponding FBI laboratory sample identification number is listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-EB-03	1894	Water

The quantitation limits reported by the laboratory for the water sample (0.5 ppb) was lower than those specified in the Project Sampling and Analysis Plan (<5 ppm). Since the low point of the initial calibration is 0.1 ppm, the PQL should be 5 ppb. The PQLs have been adjusted on the data summary form by the reviewer.

The following QC sample designations were included in project documentation: sample number WAI-EB-03 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on August 21, 1994. The range of the initial calibration was from 0.1 ppm to 10 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 30.3% was calculated using calibration factors determined from the initial calibration. The %RSD of 30.3 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 The two continuing calibration standards (128-143%) exceeded the percent recovery QC criteria of 75-125%. Therefore, the practical quantitation limits (PQLs) for the method blank and the sample are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-03 was designated as an equipment blank.

F.2 PCBs were not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analyses:

G.1 There were no field duplicate samples submitted for analysis for the PCB fraction.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recovery reported by the laboratory (140%) and the surrogate recovery calculated by the reviewer (107%) for project sample WAI-EB-03. The reviewer calculated the recovery of the surrogate using the reference area from the closest continuing calibration standard, whereas the laboratory used an average area of three continuing calibrations analyzed in August 1993. Since both surrogate recovery results met applicable QC criteria, the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 The laboratory did not perform any matrix spike and matrix spike duplicate analyses for the PCB fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The two continuing calibration standards (128-143%) exceeded the percent recovery QC criteria of 75-125%. The PQLs for the method blank and the sample are qualified "J" as estimated and usable for limited purposes.

K.2 The laboratory reported incorrect PQLs for the method blank and sample. They have been corrected on the data summary forms by the reviewer.

K.3 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blank and the sample.

L.2 The PQLs have been raised on the data summary forms by the reviewer.

L.2 Due to previously mentioned problems with the initial calibration and continuing calibrations, the detected results and the PQLs for the method blank and the sample are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX: Water
DATE: May 13, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 6 water samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 466). Two water samples were requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-EB-01	1280	Water
WAI-BKGD-SW01	1284	Water

It should be noted that all quantitation limits reported by the laboratory for PCBs (2 ppb) in the project samples were lower than those specified in the Project Sampling and Analysis Plan (5 ppb). It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF5 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 37.2% was calculated using calibration factors determined from the initial calibration. The %RSD of 37.2 exceeds the recommended method criteria of 20.0%, therefore, the detected results for PCBs in the project samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 The continuing calibration standard (File 098R2101) displayed a percent recovery of 136% for Aroclor 1254, exceeding the QC criteria of 75-125%. Therefore the PQLs for the two samples associated with this continuing calibration standard are qualified "J" as estimated and usable for limited purposes.

C.2 All other QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-01 was designated as an equipment blank.

F.2 PCBs were not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Duplicate Analyses:

G.1 There were no field duplicates submitted for analysis for the PCB fraction.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 No matrix spike/matrix spike duplicate samples were submitted with the PCB fraction.

J. Syst emPerformance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The continuing calibration standard (File 098R2101) displayed a percent recovery of 136% for Aroclor 1254, exceeding the QC criteria of 75-125%. Therefore the PQLs for the sample associated with this continuing calibration standard are qualified "J" as estimated and usable for limited purposes.

K.2 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blank and the samples.

L.2 Due to continuing calibration problems the PQLs for the samples are qualified "J" as estimated and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Polychlorinated Biphenyls (PCBs) by USEPA Method D8080.
MATRIX: Soil
DATE: May 9, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 463) for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on August 31, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-ST02-S01	1210	Soil
WAI-ST02-S02	1212	Soil
WAI-ST02-S03	1214	Soil
WAI-ST02-S04	1216	Soil
WAI-ST02-S05	1218	Soil
WAI-ST02-S06	1220	Soil
WAI-LF05-S01-1	1222	Soil
WAI-LF05-S02-1	1224	Soil
WAI-LF05-S03-1	1226	Soil
WAI-LF05-S04-1.5	1228	Soil
WAI-LF05-S07-1	1230	Soil
WAI-LF05-SD01	1232	Soil
WAI-LF05-SD02	1234	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-ST02-S03 and WAI-ST02-S06 were designated as field replicates, and sample

numbers WAI-LF05-S03-1 and WAI-LF05-S07-1 were also designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on August 21, 1994. The range of the initial calibration was from 0.1 ppm to 10 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 30.3% was calculated using calibration factors determined from the initial calibration. The %RSD of 30.3 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of $\leq$ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-ST02-S03 and WAI-ST02-S06 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

G.3 Samples WAI-LF05-S03-1 and WAI-LF05-S07-1 were also utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 Discrepancies exists between the surrogate recoveries reported by the laboratory and the surrogate recoveries calculated by the reviewer for all project samples. The reviewer calculated the recoveries of the surrogates using the reference area from the closest continuing calibration standard, whereas the laboratory used an average area of three continuing calibrations analyzed during the first week of August, 1993. Since both sets of surrogate recovery results met applicable QC criteria, the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-LF05-S04-1.5 was used for the matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory reported incorrect PQLs by not adjusting for the moisture content in samples WAI-LF05-SD01 and WAI-LF05-SD02. They have been corrected on the data summary forms by the reviewer.

K.2 Sample WAI-LF05-SD01 contained interference of biogenic orgin. It is the opinion of the reviewer that the quality of the data was not affected.

K.3 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blank and the samples.

L.2 The PQLs for samples WAI-LF05-SD01 and WAI-LF05-SD02 have been adjusted for moisture content on the data summary forms by the reviewer.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX:	Water and Soil
DATE:	May 23, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil samples and 1 water sample from the Wainwright site on August 30, 1993 (referenced chain of custody record No. 472). All samples were requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 2 and September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS04-S01	1478	Soil
WAI-SS04-S02	1480	Soil
WAI-SS04-S03	1482	Soil
WAI-SS04-S04	1484	Soil
WAI-SS04-S05	1486	Soil
WAI-SS04-S06	1488	Soil
WAI-SS09-SD01	1490	Soil
WAI-SS09-S01	1492	Soil
WAI-SS09-S02-2.5	1494	Soil
WAI-SS09-S03	1496	Soil
WAI-EB-02	1498	Water
WAI-SS09-S04	1502	Soil
WAI-SS09-S05	1504	Soil
WAI-SS09-S06	1506	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-SS04-S05 and WAI-SS04-S01 were designated as field replicates, and sample number WAI-EB-02 was designated as an equipment blank.

The analytical results for the soil samples were reported with an adjustment for moisture content. The laboratory reported a percent solid content of 108% for sample WAI-SS04-S03. The moisture content calculation was check by the reviewer on the sample worksheet and was calculated at 108%, therefore, the percent solid is assumed to be 100%.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF5 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 37.2% was calculated using calibration factors determined from the initial calibration. The %RSD of 37.2 exceeds the recommended method criteria of 20.0%, therefore, the detected results for PCBs in the project samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample number WAI-EB-02 was designated as an equipment blank.

F.2 Diesel was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS04-S01 and WAI-SS04-S05 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 Discrepancies exists between the surrogate recoveries reported by the laboratory and the surrogate recoveries calculated by the reviewer for the samples listed below. The reviewer calculated the recoveries of the surrogate using the reference area from the closest continuing calibration standard, whereas the laboratory used an average area of three continuing calibrations analyzed in August 1993.

ICF Site No.	Laboratory Results	Validation Results
WAI-SS04-S03	160%	112%
WAI-SS09-S01	160%	104%
WAI-SS09-S02-2.5	160%	104%
WAI-SS09-S03	170%	109%

H.2 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS07-S01 was used for the soil matrix spike/matrix spike duplicate analyses. The sample was not included on chain-of-custody 472. The laboratory result for the matrix spike duplicate sample could not be verified by the reviewer. It is the opinion of the reviewer that the quality of the data was not affected.

I.2 All other matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory reported surrogate percent recoveries outside the QC criteria for samples WAI-SS04-S03, WAI-SS09-S01, WAI-SS09-S02-2.5 and WAI-SS09-S03. However, when calculated by the reviewer using the internal standard area from the closest continuing calibration standards all surrogate recoveries were within the QC criteria.

K.2 Due to interference present in sample WAI-SS04-S03, the PQL for the PCBs has been adjusted to 0.4 ppm on the data summary form by the reviewer.

K.3 The laboratory did not report the correct PQLs for samples WAI-SS09-S03, WAI-SS09-S04 and WAI-SS09-S05 because the moisture content of the samples were not included in the calculation. The PQLs have been adjusted on the data summary forms by the reviewer.

K.4 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blanks and the samples.

L.2 The PQL for the PCBs in sample WAI-SS04-S03 has been adjusted to 0.4 ppm on the data summary forms by the reviewer.

L.3 The laboratory reported incorrect PQLs for samples WAI-SS09-S03, WAI-SS09-S04 and WAI-SS09-S05. The PQLs have been adjusted on the data summary forms by the reviewer.

L.4 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Clyde Hedin
ANALYSIS:	Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX:	Water and Soil
DATE:	May 23, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 3 water and 7 soil samples from the Wainwright site on August 29, 1993 (referenced chain of custody record No. 462). Two water and two soil samples were requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on August 31, 1993 through September 3, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-BKGD-S01	1236	Soil
WAI-BKGD-SD01	1238	Soil
WAI-LF05-SW02	1250	Water
WAI-LF05-SW01	1256	Water

The laboratory reported sample 1256 as 1255 on the Laboratory Report Summary form. These laboratory sample numbers refer to the same sample, as indicated on the Chain of Custody form.

The analytical results for the soil samples were reported with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for PCBs (2 ppb) in the project samples were lower than those specified in the Project Sampling and Analysis Plan (5 ppb). It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF5 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 37.2% was obtained using calibration factors determined from the initial calibration. The %RSD of 37.2 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

B.2 The laboratory performed a five point initial calibration on GC Instrument ICF6 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 30.3% was calculated using calibration factors determined from the initial calibration. The %RSD of 30.3 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blanks at concentrations above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blanks at concentrations above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis for the PCB fraction.

G. Field Duplicate Analyses:

G.1 There were no field duplicates submitted for analysis for the PCB fraction.

H. Surrogate Recoveries:

H.1 Discrepancies exist between the surrogate recoveries reported by the

laborator yand the surrogate recoveries regenerated by the reviewer for the project samples listed below. The reviewer calculated the recoveries of the two samples using the average surrogate area from the initial calibration standards.

ICF Site No.	Laboratory % Recovery	Validation % Recovery
WAI-BKGD-S011	99	114
WAI-BKGD-SD01	85	97
WAI-LF05-SW02	91	150
WAI-LF05-SW01	85	139
Tap Water Blank	NR	165
Tap Water MS	99	168
Tap Water MSD	100	170

The tap water blank surrogate recovery was not reported by the laboratory. Surrogate recovery discrepancies are probably due to inconsistent quantitation procedures performed by the laboratory.

H.2 All project sample surrogate recoveries met applicable QC criteria and the results are considered acceptable. The high surrogate recoveries in the tap water blank, matrix spike, and matrix spike duplicate are not expected to have an effect on the project sample PCB results.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS07-S01 was reported by the laboratory for the soil matrix spike/matrix spike duplicate analyses. Tap water samples were used and reported by the laboratory for the water matrix spike/matrix spike duplicate analyses.

I.2 Sample number WAI-BKGD-S01 was analyzed for the soil matrix spike/matrix spike duplicate determinations, but these results were not reported by the laboratory. The reviewer calculated the matrix spike/matrix spike duplicate recoveries of sample WAI-BKGD-S01, which are given in the following table.

ICF Site No.	Laboratory % Recovery	Validation % Recovery
WAI-BKGD-S01MS	NR	105
WAI-BKGD-SD1MSD	NR	98

I.3 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 No problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQL in the method blank and the project samples.

L.2 Due to previously mentioned problems with the initial calibration and continuing calibrations, the detected results and the PQLs for the method blank and the sample are qualified "J" as estimated and usable for limited purposes.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM:	WAINWRIGHT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY:	Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER:	Timothy Vonnahme
ANALYSIS:	Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX:	Water and Soil
DATE:	May 18, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 7 soil and 3 water samples Dfromthe Wainwright site on August 30, 1993 (referenced chain of custody record No. 468). Seven soil samples were requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 2, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
WAI-SS07-SD01	1452	Soil
WAI-SS07-SD02	1454	Soil
WAI-SS07-SD03	1456	Soil
WAI-SS07-SD04	1450	Soil
WAI-SS07-S01	1458	Soil
WAI-SS07-S02	1460	Soil
WAI-SS07-S03	1462	Soil

The following QC sample designations were included in project documentation: sample numbers WAI-SS07-S01 and WAI-SS07-S03 were designated as field replicates.

The analytical results for the soil samples were reported with an adjustment for moisture content.

The laboratory reported incorrect ICF ID numbers for samples WAI-SS07-SD01 (1452) and

WAI-SS07-S02 (1460). They have been corrected on the data summary forms by the reviewer.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF5 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 37.2% was calculated using calibration factors determined from the initial calibration. The %RSD of 37.2 exceeds the recommended method criteria of 20.0%, therefore, the detected results for PCBs in the project samples are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples WAI-SS07-S01 and WAI-SS07-S03 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 A discrepancy exists between the surrogate recovery reported by the laboratory (150%) and the surrogate recovery calculated by the reviewer (195%) for project sample WAI-SS07-S03. The reviewer calculated the recovery of the surrogate using the reference area from the closest continuing calibration standard, whereas the laboratory used an average area of three continuing calibrations analyzed in August 1993. Since the percent recovery is outside the QC criteria, the PQL for all the PCBs in this sample are qualified "J" as estimated and usable for limited purposes.

H.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number WAI-SS07-S01 was used for the soil matrix spike/matrix spike duplicate analyses. The laboratory result for the matrix spike duplicate sample could not be verified by the reviewer. It is the opinion of the reviewer that the quality of the data was not affected.

I.2 All of the other matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory raised the PQL for all the PCBs in sample WAI-SS07-S01 to 1 ppm. The PQL was also raised by the laboratory for only Aroclor 1254 to 1.3 ppm in sample WAI-SS07-S02, and only Aroclor 1254 to 1.9 ppm in sample WAI-SS07-S03, leaving the PQL for the remaining PCBs set to 0.1 ppm. Major interferences were present in all three samples resulting in selected elevated PQLs. The reviewer was unable to verify the PQLs reported by the laboratory for Aroclor 1254 for the two samples listed above. It is the opinion of the reviewer that the PQL for all the PCBs in samples WAI-SS07-S01, WAI-SS07-S02 and WAI-SS07-S03 should be adjusted to 2 ppm due to interference. The PQLs for these three samples have been adjusted on the data summary forms by the reviewer.

K.2 The laboratory reported incorrect ICF ID numbers for samples WAI-SS07-SD01 (1452) and WAI-SS07-S02 (1460). They have been corrected on the data summary forms by the reviewer.

K.3 The surrogate recovery for sample WAI-SS07-S03 was outside the QC criteria, therefore, the PQL for the PCBs are qualified "J" as estimated and usable for limited purposes.

K.4 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected at a concentration above the PQLs in the method

blank and the samples.

L.2 The PQLs in samples WAI-SS07-S01, WAI-SS07-S02 and WAI-SS07-S03 have been adjusted to 2 ppm on the data summary forms by the reviewer.

L.3 The surrogate recovery for sample WAI-SS07-S03 was outside the QC criteria, therefore, the PQL for the PCBs are qualified "J" as estimated and usable for limited purposes.

L.4 All other data are considered valid and usable for all purposes.